

# NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

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## ► FACILITIES MANAGEMENT

# EDS spins off network unit

*Aims to build total nets for big users.*

BY BOB WALLACE  
Senior Editor

DALLAS — In an attempt to duplicate its success in the data processing industry, Electronic Data Systems Corp. (EDS) has spun off a division, dubbed EDS Communications Corp., to provide users with one-stop shopping for communications systems, *Network World* has learned.

The new company will offer users a communications facilities management package that includes equipment acquisition and installation, and network operation and monitoring.

According to one industry analyst, EDS Communications is negotiating with Northern Telecom, Inc. and Tandem Computers, Inc. for the bulk purchase of network gear it would use to solve users' voice and data networking needs.

EDS spokesman Jim Jaros acknowledged the existence of the

new firm last week, but said EDS Communications' charter has not been fully drafted.

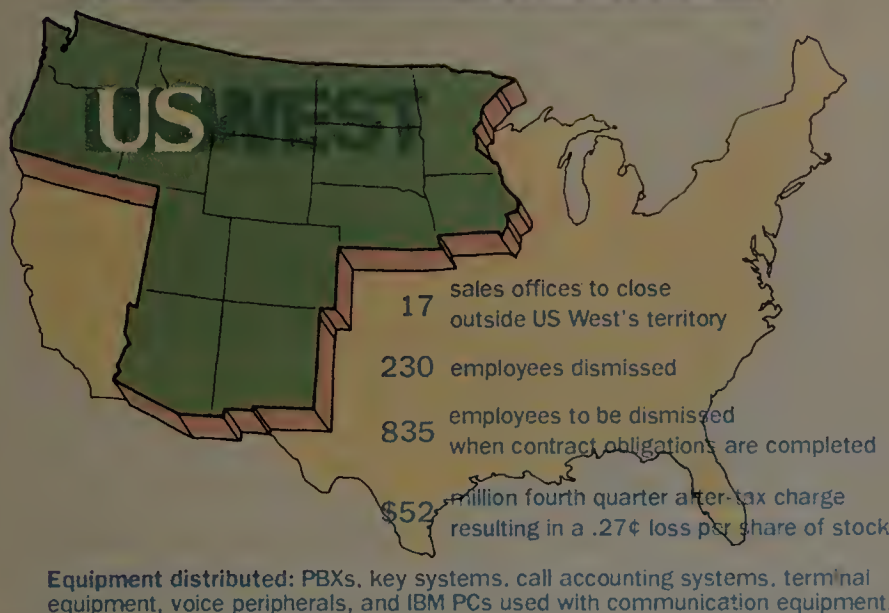
Howard Anderson, managing director of Boston-based Yankee Group, a market research and consulting firm, claimed EDS expects the new company to deliver roughly 10% of EDS' total revenue by 1991. EDS would neither confirm nor deny details concerning EDS Communications' marketing plans.

According to Jaros, the company is under the direction of Gary Fernandes, senior vice-president of EDS' international communications and commercial operations. Fernandes will serve as chief executive officer of the venture.

Anderson maintained the fledgling company's first customers will be in the health care and manufacturing industries, areas in which EDS has already built a substantial user base and a solid reputation as a systems integrator. EDS, a sub-

See **EDS** page 50

## US West beats a retreat on equipment distribution



## ► CUSTOMER PREMISES EQUIPMENT CUTBACKS

# US West pulls in reins on CPE sales, idles 1,000

BY KARYL SCOTT  
Washington, D.C. Correspondent

DENVER — Hit with increasing competition and declining profit margins in the customer premises equipment market, US West Information Systems retreated last

week, saying it would close down sales operations outside its 14-state territory and lay off more than 1,000 workers.

US West's action is a reflection of customer premises equipment industry consolidation and pressure

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## NETWORK LINE

### News

MCI steps up its efforts to become a lean, mean competition machine with a proposal to cut its T-1 tariffs by 30%. Page 2.

AT&T and Boeing combine their resources to vie for the gigantic multiservice FTS 2000 contract, a 10-year pact worth \$4.5b. Page 2.

AT&T seeks to shift authority over BOC waiver requests from the Department of Justice to the FCC, a change seen by some as a bane for the BOCs and a blessing for

users. Page 2.

Users need to do some soul-searching, starting at the bottom and working their way up, in preparation for the implementation of ISO protocols. Page 4.

Novell responds to user dissatisfaction with technical support for Netware by setting up Netware Services Response Centers, due to open in January. Page 5.

### Features

This week's special section on communications software covers the gamut of software issues of concern to managers today. Page 19.

## FEATURE FOCUS

# The transparent link

BY DOUGLAS GOLD, GEORGE NEWMAN  
AND KIM MYHRE  
Special to Network World

Deciding what communications software is and how to use it most effectively might be the stickiest wicket for communications managers. As the number of vendors increases, the number of

choices becomes staggering. For the most part, communications managers define software in terms of its relationship with hardware, not in terms of function.

Communications software is in microcomputers, terminal controllers, front-end processors, minicomputers and

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## ► CHRISTMAS CRUNCH

# Yule time flood hits networks

BY MICHAEL FAHEY  
Staff Writer

It's Christmastime, and Santa Claus is making a list and checking it twice. But for communications managers at organizations that do big business this time of year, getting ready for the seasonal crunch is a considerably more elaborate process.

Increased holiday business means beef-

ing up the capacity of networks. And for communications managers, the planning for that increased capacity begins long before the holiday rush arrives. "We begin planning for the next year's rush practically the day after Christmas," said Chuck McCullough, telecommunications and planning manager at Spiegel, Inc., the giant catalog house based in Oak Brook, Ill.

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## ► T-1 TARIFFS

# MCI cuts T-1 rates 30%, offers multiyear deals

*Carrier fights back after recent layoffs.*

BY BOB WALLACE

Senior Editor

WASHINGTON, D.C. — MCI Communications Corp. last week proposed to pare roughly 30% off its current T-1 service tariff, a move that would put the No. 2 long-haul carrier's rates 10% below AT&T's prices for similar offerings.

If approved by the Federal Communications Commission, the price cut for MCI's TDS 1.5 service would take effect Feb. 1.

MCI also proposed a series of volume and long-term discounts for TDS 1.5 users who opt for 1-, 3- or 5-year service contracts, and proposed creating a service option that will enable users to dictate use of

fiber facilities for T-1 links.

MCI's proposed price cuts, which will chip away at much-needed revenue, are driven by competitive pressures but, in terms of the company's finances, come at a hard time. Two weeks ago, the carrier announced a series of belt-tightening measures that included reductions in capital expenditures earmarked for network expansion and layoffs of 2,400 employees.

The carrier will gradually reduce its work force by 15% and lop more than \$100 million off its 1987 network construction budget. The company also announced it would take a \$500 million to \$700 million one-time charge against earnings in the fourth quarter of this year.

Gerald Mayfield, president of

the Professional Services Division of the Stamford, Conn.-based DMW Group, a market research and consulting concern, claimed MCI's action is a competitive response to similar actions taken by AT&T and other T-1 service providers. "This announcement reflects growing price competition in the T-1 service market that has its roots in the huge amount of fiber that was put in the ground over the last few years," he explained.

MCI said customers who use the TDS 1.5 service in excess of 150,000 minutes per month would enjoy a 3% service discount. Subscribers who use the service in excess of 300,000 minutes per month would receive a 5% service discount, the carrier maintained.

Users that sign a 1-year contract for TDS 1.5 service would receive a 1.5% discount, those signing 3-year contracts for the T-1 offering would receive a 4.5% service discount, and users inking 5-year contracts for the service would receive an 8% service discount, the carrier explained.

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## ► MFJ

# AT&T tries to alter waiver rule

*BOCs and users on opposite sides.*

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — AT&T last week asked U.S. District Court Judge Harold Greene to shift responsibility for review of Bell operating company line of business waiver requests from the U.S. Department of Justice to the Federal Communications Commission.

Users applauded AT&T's plan because it would allow them to voice their concerns about waivers before the FCC. But the FCC said the change would create confusion, and the BOCs denounced the proposal as a ploy to delay their entry into new markets.

Under AT&T's proposal, outlined in a motion filed with Greene, the FCC would review BOC waiver requests and make recommendations to Greene regarding their merits. Greene would retain final say over which waivers are approved. Under the current structure, the Department of Justice screens waivers and makes recommendations to Greene.

AT&T's stated objective is to "streamline the review process," according to a company spokeswoman. "Since divestiture [in 1984], more than 140 waiver requests have been filed with the court, and the Justice Department has expressed concern that its waiver-screening obligations have become overwhelming," according to an AT&T statement. Justice has received 69 waiver petitions this year and has only three staff attorneys to review them.

An FCC official said AT&T's motion would complicate the waiver process rather than streamline it. "The view from this office is that such a procedure would create problems," said Janice Obuchowski, senior advisor to FCC Chairman Mark Fowler. "Such a transfer would complicate the jurisdictional issues, not simplify them. It would put us in the uncomfortable position of having to look at the waivers from both a public interest standpoint as well as an antitrust standpoint in order to satisfy our congressional mandate and

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## ► FEDERAL NETWORK

# AT&T and Boeing join in FTS 2000 bid

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — AT&T and Boeing Computer Services Co. last week joined forces to bid on the \$4.5 billion, 10-year contract to design, implement and manage the new Federal Telecommunications System 2000 (FTS 2000).

The joint bid calls for AT&T to act as prime contractor and for Boeing to bring project management and systems integration skills to the team, which will also include

the Bell operating companies.

Boeing's involvement with AT&T also represents the withdrawal of its bid, delivered in July, to serve as the primary FTS contractor. Company spokesman John W. Alter said Boeing's decision to sign on as a subcontractor did not diminish the company's role.

"This is such a huge contract, we expect to play a major role in its design and execution," he said. Boeing did not cite subcontractors in its earlier bid.

Boeing based its original bid on

its experience as a large systems integrator and its extensive involvement in government contracts.

"FTS is not a systems integration task with networking implications," said Boeing President Robert L. Dryden. "It is a network task with significant systems integration and project management facets. The successful team must understand the unique requirements of network projects, and I don't think anyone would question AT&T's networking experience."

According to Louis Golm, AT&T's vice-president of Federal Systems and General Services Administration (GSA) programs, the BOCs will be involved in the contract because they are "in the best position to provide local access to FTS 2000." Golm did not rule out the possibility of bypassing the BOCs to directly connect some large sites to the AT&T backbone.

No other subcontractors have been named to the team as yet.

FTS 2000 will provide voice, data and video services to 1.3 million federal employees in 3,500 locations throughout the U.S., Puerto Rico and the U.S. Virgin Islands. The system will consist of six primary services on a usage-price basis: switched voice, switched data, switched integrated voice/data, video transmission, packet-switching and dedicated transmission.

Integrated Services Digital Network features will also be incorporated into the new network as they are developed.

The only known competitor to the AT&T/Boeing duo is Martin Marietta Corp., which announced its intention to bid on FTS 2000 as a prime contractor last July.

Martin Marietta's team includes

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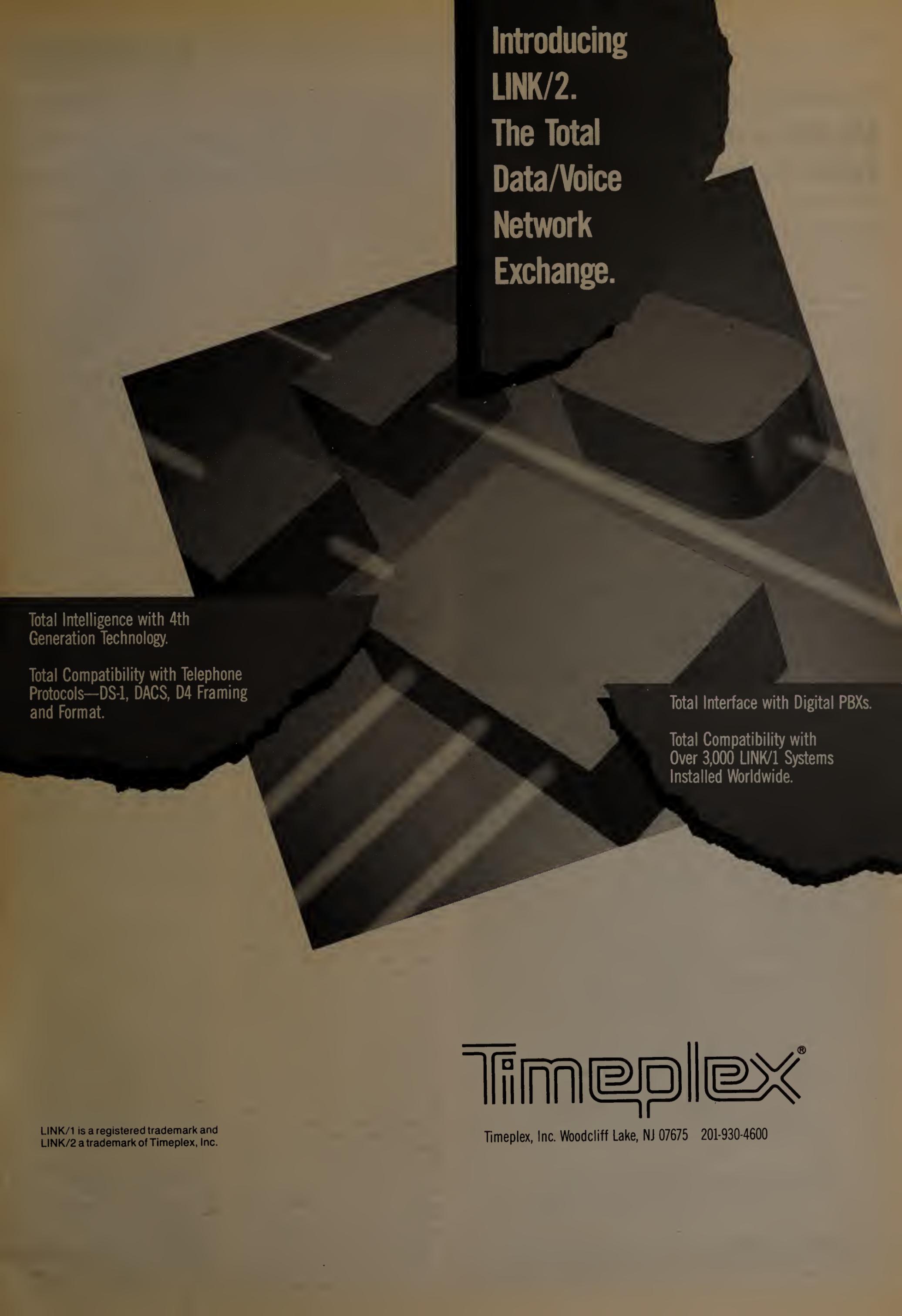
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## ► INTERNATIONAL STANDARDS

# Users contemplate OSI, how to implement it

*Getting to the land of interoperability.*

BY MARY PETROSKY

West Coast Correspondent

Despite the promise the International Standards Organization's (ISO) protocols hold for multivendor equipment networking, users still face a number of important questions. Does your company need to migrate to international communications standards? If so, how do

you get there from here?

The ISO's Open Systems Interconnect model is intended to provide an architecture to standardize communications between different types and makes of computers. The ISO has specified protocols for each layer of the model for vendors to emulate in their products.

"Users need to ask themselves what their long-term local

networking needs are. If all you want to do is tie together three personal computers with a file server, what do you care if it's running [Xerox Network Services], ISO or whatever," said Russell Sharer, director of marketing for Communication Machinery Corp. in Santa Barbara, Calif.

Users should bear in mind that OSI's purpose is to allow heterogeneous computer and communications equipment to coexist on the same network, said Cory VanWolvelaere, a manager in the telecommunications consulting group of Arthur Andersen & Co., headquartered in Chicago. Not every company needs every piece of equipment they own to be able to talk to every other piece of equipment, he said. But OSI will make it easier to tie two remote networks together, or to connect to networks internationally using a global switching net.

While vendor strategies will, in many ways, dictate how users implement ISO protocols, communications managers can start to develop an overall plan for their companies. The best approach is to start at the bottom — the physical and link layers — and work your way up, according to VanWolvelaere.

He also recommends that users bring up ISO protocols on one type of system at a time. If ISO protocols are successfully implemented on one vendor's hardware, then they can be expanded to other vendors' equipment.

"You're going to have to approach this on a vendor-by-vendor basis. It's a slow process," VanWolvelaere said. "Moving up the OSI tiers is our basic strategy, but we've found there's a lot of room for interpretation of the specs."

Arthur Andersen has been working with government agencies in the UK to implement ISO-compatible products. Based on this experience, VanWolvelaere warns that users should perform rigorous testing to ensure that the makers of the various equipment implement the ISO protocols in a similar way.

Achieving this compatibility may require users to sit down with vendors to resolve specification differences. VanWolvelaere also recommends that users stick to ISO products that are clearly layered, which means the vendor has provided separate protocol modules. Without that clear layering, users may face difficulties if they want to make changes later, he said.

In the U.S., the Department of Agriculture (USDA) is implementing ISO protocols from the bottom up. The USDA is currently using X.25 across a wide range of systems and networks to provide certain agencies with services up through the network layer.

"We're looking to implement OSI where it's cost-effective," said Ken Lini, communications engineer for the USDA. "However, we need a complete architecture to solve our problem, so we have to find and develop integration products that will make us a complete architecture."

Lini and his staff have developed their own file transfer protocol that sits on top of X.25. Lini be-

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## ► VENDOR SUPPORT

# Novell strives to match service with products

BY MICHAEL FAHEY

Staff Writer

NEWTON, Mass. — In an effort to lay to rest complaints about inadequate support for its Netware network operating system, Novell, Inc. has established a Netware Services Response Center that will begin operation in January.

Novell officials said the service center will provide users access to technical support staffers through a toll-free telephone number. Judging from the response of users attending the first meeting of the Greater Boston Netware Users Group here last week, the move was long overdue.

Group members charged that Novell users have been victims of the company's success. They say Novell's rapid expansion has hindered its ability to support Netware.

"I have a love-hate relationship with Novell. I love their product, but hate their support," said James Poli Jr., operations manager at Channel One, a cable and satellite television vendor based here.

Poli's sentiments were shared by many of those attending the Netware users group meeting here. Edwin Wilk, microcomputer network specialist at Boston's WNEV-TV said, "In television, things move fast. If something goes wrong, I have to fix it quickly. I expect the same kind of response from vendors." But, Wilk said, he has not been pleased with Novell's support.

Novell representatives Reid Clark, manager of user relations, and Kip Hakanson, director of Netware services marketing, made no effort to deny the company's problems in supporting dealers, distributors and end users.

"We recognize the need for a single source of accurate and fast answers," Hakanson said. In an effort to provide that support, the company has set up an 800 number to connect callers to some 65 staffers at the company's new headquarters in Provo, Utah. The 800 number is currently in service, but the Netware Services Response operation won't be fully operational until Jan. 1, 1987, said Hakanson.

Currently, Netware users seeking technical support must turn to the dealer or distributor. But some users have charged that dealers and distributors who sell Netware are not capable of adequately supporting users.

"What our dealer did to us can only be described as a crime," said Channel One's Poli. He said the dealer led him to believe he could properly support Netware and added that the dealer had a good track record for supporting other products Channel One had purchased. In the case of Netware, Poli said, the dealer was unfamiliar with the product.

Reid Clark, manager of user relations at Novell, said dealers and distributors will be given priority

when calling the Netware Services Response Center.

Members of the new Netware users group greeted the announcement of the Netware Services Response Center with cautious optimism.

In related news, Novell this week released financial information for the fourth quarter and 1986 fiscal year ended Oct. 25. Novell's fourth quarter revenue was \$28.3 million, 130% higher than the similar quarter in 1985. Profit for the fourth quarter was \$3.37 million, compared to \$1.65 million in the fourth quarter of 1985. For the year, Novell's profit was more than \$10 million on revenue of \$81.5 million. Last year, revenue was \$33.6 million and profit \$4.1 million. □

## ► FIBER OPTICS

# Standardized net to bow

BY JIM BROWN

New Products Editor

HYANNIS, Mass. — Fibronics International, Inc. is poised to introduce a fiber-optic network built around the emerging Fiber Distributed Data Interface (FDDI) standard next month, *Network World* has learned.

The as yet unnamed product, scheduled to be released Jan. 13, is a 100M bit/sec fiber-optic network capable of operating at distances up to 24 miles, according to Fibronics Chairman J. Morris Weinberg. The company is developing network interface boards for a variety of minicomputer and mainframe processors.

The network is intended to connect mainframes to mainframes, link engineering workstations with each other or with host systems or interconnect existing Ethernet and token-ring networks through gateways and bridges.

Analysts say Weinberg's description fits the FDDI standards now emerging from the ANSI X3T9.5 work group. The ANSI FDDI standard describes a token-passing network employing two pairs of fibers operating at 100M bit/sec. Weinberg said he could not comment on the technology used until the product announcement date.

"If it's not based on FDDI, it's a mistake," said Greg Cipriano, senior partner in Stoughton, Mass.-based Telecommunications Re-

sources. "FDDI is something the fiber industry has been anxiously awaiting. The time has finally jelled where things should start to happen with it."

Bob Reinhold, a consultant schooled in fiber technology and working with the Fairfax, Va.-based Network Strategies, Inc., agreed the FDDI standard has developed to the point where products based on it could start reaching the market. "Most of it is pretty much defined," he said.

Weinberg acknowledged the network will be based on emerging standards but declined to name that standard. He did say, however, that Fibronics has members sitting on committees developing fiber-optic communications standards. "As parts of the network began to jell, we began to put our own research and development bucks into converting what was a draft standard into the start of a piece of hardware."

"We have the network. It is not just theory," Weinberg said, claiming the firm will deliver the first network in February. That customer, whom he declined to name, expects to use the network to connect engineering workstations with high bandwidth communications requirements.

To help develop processor interfaces, Weinberg said the firm will rely on Lowell, Mass.-based Spartacus, Inc., a software house specializing in development of IBM- and

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## ► USER PIONEERS

## “McISDN” test begins

BY MARY PETROSKY  
West Coast Correspondent

OAK BROOK, Ill. — McDonald's Corp. will become the second user to initiate trial Integrated Services Digital Network services when Illinois Bell cuts over ISDN lines for the fast food giant next Tuesday.

McDonald's USA President Ed Resnie and Illinois Bell President Orm Wade will launch the ISDN trial with a telephone call. During the call, they will converse and exchange personal computer data over one ISDN line, while video images of the two men are transmitted simultaneously over a second ISDN line.

“We're going full-speed ahead and have no second thoughts about the trial,” said Patrick Krause, McDonald's staff director of telecommunications. “There are always some tradeoffs when you're the first. But, we're in a position to influence ISDN development and to be one of the first to derive benefits from this technology.”

Last month, Mountain Bell, in conjunction with Northern Telecom, Inc. and NCR Corp., inaugurated ISDN service with the Arizona Department of Transportation as its first user.

Illinois Bell's trial is expected to run approximately 18 months and involve three McDonald's sites in Oak Brook. Initially, basic voice services, along with packet-switched and circuit-switched data services, will be provided.

Enhanced voice services, such as call forwarding and call waiting, which McDonald's now enjoys as a Centrex user, will not be available until the fourth quarter of next year. Illinois Bell has encountered delays in developing the software to support those enhanced services, according to a spokesman for the telephone company.

Initially, about 25 ISDN lines, which employ the same type of twisted-pair wiring used for gener-

al telephone service, will be used in the trial. The number of ISDN lines will grow to 400 by the end of the trial, and at least four of the company's departments will be involved.

Illinois Bell is using AT&T Network Systems Group's 5ESS switch in the trial and will employ the 2B+D Basic Rate Interface. This interface specifies two 64K bit/sec digital B channels for transmission of voice and data as well as one 16K bit/sec D channel for signaling or low-speed data.

Customer premises equipment, such as digital telephone sets, terminal adapters and integrated voice and data terminals, is being provided by

AT&T, NEC America, Inc. and Fujitsu America, Inc. Telrad, Harris Corp. and Hayes Softcom are also scheduled to provide customer premises equipment. Krause believes as many as 10 customer premises equipment vendors may ultimately be involved.

Krause said he expects to run ISDN devices in parallel with the hamburger giant's existing networks and equipment at least through 1987. At that time, he an-

ticipates 300 ISDN lines will be in place, and the company will begin to use the ISDN network and devices for production applications.

Krause said he sees numerous advantages to ISDN, the most important of which is the architecture itself. “We now have an evolving architecture and interfaces that give a great deal of flexibility to handle information, regardless of the information type,” he said.

Specifically, ISDN will allow users to consolidate different networks. He estimates that McDonald's, like many large companies, has almost a dozen networks, ranging from Centrex and long-distance voice networks to computer networks using IBM's Systems Network Architecture. Through consolidation, Krause expects to be able to save considerable money on wiring and relocation of equipment, and through less duplication, he said McDonald's will save on hardware and software, administration and network access.

Illinois Bell first broached the subject of ISDN with McDonald's in response to a request for proposal from the company. Illinois Bell's ISDN proposal met the company's technical requirements for voice/data switching and messaging. □

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## Christmas from page 1

At Visa International, the seasonal spike in network traffic serves as the base for the following year's net capacity, said spokesman Dan Brigham. “This Christmas season our net will handle 5,340 transactions per minute,” Brigham said. “We'll have 200 million transactions between Thanksgiving and Christmas Eve, worth about \$10 billion.”

The number of transactions handled by the Visa network during the holiday season is 20% more than during nonpeak periods. In addition, the number of credit authorization inquiries handled by the Visa network during the holiday period increases by 45% over the rest of the year. Not all transactions involve authorizations, Brigham said.

Visa runs two credit card networks, Brigham said. One is an on-line authorization setup linking 330,000 point of sale terminals throughout the country to 270 regional processors, most of which are IBM Series/1 minicomputers.

Each of the 270 interface processors are linked to one of two Visa interchange centers. The interchange centers are located in McLean, Va., and at Visa headquarters in San Mateo, Calif.

According to Scott Loftness, vice-president for engineering at Visa, the network employs a variety of dial-up and dedicated phone lines as well as packet-switching services from Compuserve, Inc. AT&T's recently introduced Validator service, which provides discounts for companies that receive a large number of short-duration 800 calls, is also used.

The other network serves the Visa clearing and settlement service. Unlike the authorization network, the clearing and settlement

net is an off-line system. It is used to settle accounts between banks, merchants and customers.

At Spiegel, the retail mail order house, the holiday gift-buying season naturally means a significant boost in business. About 80% of the company's orders come in via telephone, according to John Hardick, facilities and communications manager. Calls from customers come in to three order centers via AT&T 800 service 24 hours a day, seven days a week.

During the holidays, the company adds 140 incoming 800 lines to its normal stable of 350 lines. Operators at the order centers access Spiegel's data center in Westmont, Ill., via dedicated lines, while customers stay on the telephone.

During the first week of December, Spiegel received 540,000 calls.

During an average week, the company handles about 250,000 calls, said Spiegel's McCullough.

Spiegel employs AT&T's advanced 800 features to control the flow of calls at its three order facilities, McCullough said. Using a terminal in the company's Bensalem, Pa., facility, McCullough is able to access the AT&T net and shift the call load at the three Spiegel order centers.

At Zale Corp., an Irving, Texas-based retail jewelry company with some 1,400 stores throughout the country, 50% of the company's annual business comes during the weeks between Thanksgiving and Christmas.

“We have what I would call a multitiered network,” said Tim Bergmann, communications systems manager. “In addition to our

stores, we have four regional credit centers and two manufacturing facilities on the network. We support credit operations, manufacturing and shipping and gather sales and inventory data with the network.”

Bergmann said Zale tries to engineer its network so that it is ready for peak load, much like a utility company. “A large portion of the year you will find that our percentage of line utilization is very low,” Bergmann said. “This time of year it is very high. We are running at about 70% of line capacity.”

Bergmann said planning begins with the budgeting process, and right now Zale is budgeting to meet next Christmas's needs. “In June and July, we will begin negotiating with the vendors for whatever additional lines or hardware we need,” he said. □

## ► ACQUISITIONS

## AT&amp;T poised to devour Ford Satellite division

BY PAM POWERS  
Senior Editor

WASHINGTON, D.C. — In what could be the industry's steal of the year, AT&T last week uncloaked its plan to purchase Ford Aerospace Satellite Services Corp. (FASCC) for \$2.7 million.

If the deal is approved by the Federal Communications Commission, AT&T would acquire two partially constructed communications satellites, each worth tens of millions of dollars.

The company would also gain the much-coveted authorization to launch and operate the satellites,

as well as ownership of other “intellectual assets” that could accelerate AT&T's satellite research and development drive.

One such asset, access to FASCC-developed satellite cross-strapping technology, may be of inestimable value to AT&T. This technology enables Ku-band satellite transponders to process C-band transmissions and C-band transponders to process Ku-band transmissions. AT&T is anticipating growing demand for Ku-band transmission.

The explosion of the Space Shuttle Challenger, followed by several other satellite launch vehicles' inability to reach orbit, dashed

FASCC's original plan to lease transponder capacity to other satellite service providers and users, including long-distance companies.

FASCC has held launch-authorization rights since mid-1985 but has not been able to launch because of vehicle problems.

In an appeal to the FCC, AT&T and FASCC asked for authorization to transfer launch rights and for an extension of the launch authorizations until 1992 and 1993. AT&T said it hopes to proceed with engineering and development work on the satellites in the near future.

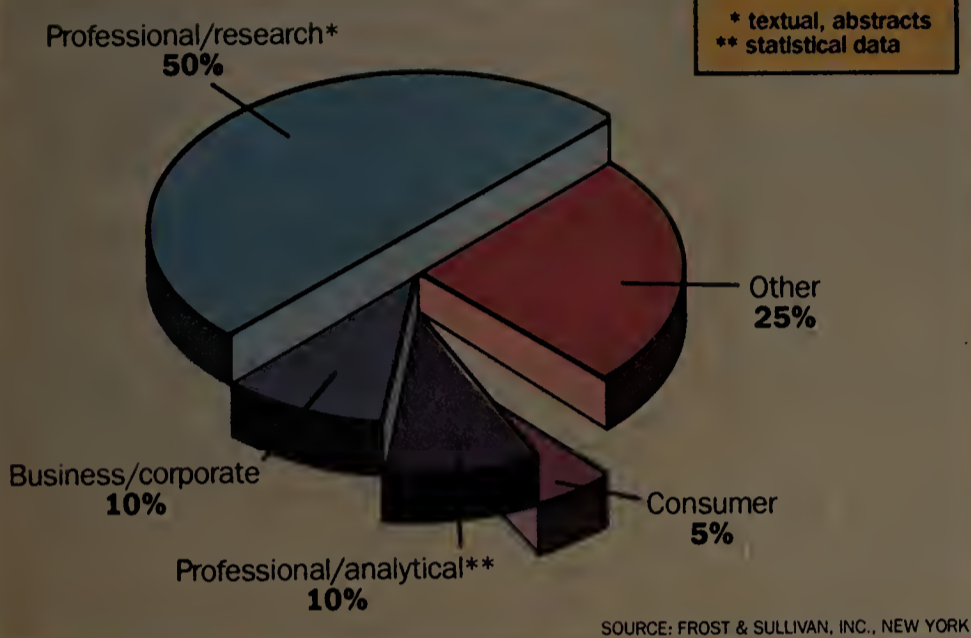
In July of this year, FASCC said it would reassess its strategy in the wake of launch delays. To complicate matters, corporate parent Ford Motor Co. in 1984 purchased 70% interest in Starnet Data Systems Co., a satellite services provider. That majority interest cast some doubt on FASCC's importance to the company. □

# INDUSTRY UPDATE

## High court restricts merger challenges

The U.S. Supreme Court last week handed down stricter conditions under which a company can block proposed mergers of competitors with existing antitrust laws. The new ruling states that a company must show evidence that the merger causes loss or injury and that such loss is the result of anticompetitive action. The decision will make it more difficult for companies to challenge the rash of mergers occurring today.

### Breakdown of on-line data base users



### VENDOR VIEW MARK DAVIES

## Will Santa buy foreign or domestic this year?

**D**istributed through a recent edition of the Sunday *Boston Globe* were more than 35 ads for cameras — some 22 brands were Japanese.

While it's not surprising that Japan is dominant in this market, other ads in the same issue demonstrate a strong Japanese presence in automobiles, stereos, china, watches, microwave ovens, synthesizers, video cassette recorders and television sets.

In fact, as consumers preparing our Christmas lists, we are likely to prefer the Japanese product. We know it represents quality workmanship and sound technology at a competitive price.

Certainly the Japanese have been more than responsive to the ongoing consumer yearning for a new and better product. If we don't like what's on the market today, all we have to do is wait a week and a new choice appears.

It's easy to see the Japanese eating into our market for consumer goods. What most of us don't want to open our eyes to is the very real threat of global competition to all U.S.-based in-

dustries, not just from the Japanese but from other emerging nations such as Korea and China.

A look at trade balances and national market shares over the past 26 years makes us want to remain oblivious, but we must face facts.

In 1960, we were touting a world market share of 16%. By 1982, our share had fallen to 11%. In 1960, Japan was barely in the picture with 5%. By 1982, their market share had doubled.

Take a look at our import figures, and the problem is crystal clear. In that same 22-year span, imports more than quadrupled to 23%.

Staggering, you might say. How could we have let this happen to us? Why didn't we see it coming? In some cases, it takes a true beating in order to realize our Achilles' heel. The color television industry is a case in point.

In the 1960s, the U.S. clearly dominated that market. Sure, the Japanese had been producing black and white sets for years and, by 1967, had become the world's largest producers by being the low-cost manufacturer.

But that wasn't where the profit margins were; the money

See Japan page 8

### ► PENNY-PINCHING PLAN

## Infotron girds for big losses

*Consolidates to cut costs.*

BY PAM POWERS  
Senior Editor

CHERRY HILL, N.J. — Infotron Systems Corp. said last week it expects to suffer a significant fourth-quarter loss and hinted that it may have to trim its work force and product line.

Infotron President and Chief Executive Officer James C. Hahn said the company has implemented a cost reduction program that will lead to an unspecified charge against earnings in the fourth quarter.

That will have a "significant adverse impact" on the company's 1986 financial picture, but is expected to improve earnings next year, Hahn said.

Company officials declined to divulge estimated fourth-quarter or year-end financial information. Infotron suffered a significant earnings drop from the second to third quarter, ended Sept. 30. Third quarter earnings were \$518,000 on \$20.9 million revenue, compared with \$891,000 second-quarter earnings on a record revenue of \$21.7 million.

Infotron's vice-president of finance, David Barnhill, said that 44 unit managers will oversee the program to reduce overhead and streamline operations. In an initial interview, Barnhill indicated the streamlining effort would lead to an unspecified number of layoffs.

"A big part of the write-down is provision for the cost of terminations," he said. "We will try to identify by the end of the month specific positions to be eliminated. As much as possible, we will try to redeploy good people."

But in a later interview, Barnhill countered those remarks, saying there would be no layoffs of direct production staff, although the program might result in some "manpower savings."

Another result of the cost-reduction program may be the consolidation of product lines, Barnhill said. "We need to put emphasis on products that are selling well," he said. "That may mean cutting out the laggards in our product line."

Infotron's T-1 Infostream multiplexer has not sold as well as expected, a factor contributing to a

See Infotron page 51

### ► ACQUISITION

## Bridge buying Phoenix

BY PAULA MUSICH  
Senior Editor

MOUNTAIN VIEW, Calif. — Bridge Communications, Inc. announced last week that it plans to acquire Santa Clara, Calif.-based Phoenix Technology, Inc., a network equipment start-up founded by Ungermann-Bass, Inc.'s former director of engineering, Joseph Kennedy.

The 11-member firm, founded in 1985 under the cloud of a trade secrets lawsuit brought by Ungermann-Bass, has been working with Bridge Communications for the past year on development of a fault-tolerant Transmission Control Protocol/Internet Protocol communications server based on Bridge Communications' CS/1 server. Terms of that lawsuit, settled

out of court, were never disclosed. The acquisition, terms of which were not disclosed, will allow Bridge Communications to more aggressively pursue business with government agencies, banks and organizations that require greater network reliability and security.

That is "an emerging segment of the local networking market," according to Jack Bradley, Bridge Communications' chief financial officer.

Government business currently accounts for roughly 10% of Bridge Communications' revenue. "This will quite possibly grow to 20% next year," Bradley said.

"There is growing interest among government customers for computer networks that are protected against physical damage to

See Bridge page 51

Davies is vice-president of Wide Area Network Operations at Codex Corp., Mansfield, Mass.

**Japan from page 7**

was to be made in higher margin color consoles. As competitors, the Japanese were not taken seriously.

By the late '60s, they led the process technology market by making massive investments in automatic insertion and testing equipment, component rationalization, automated final assembly and integrated circuit technology.

Their initial entry into the U.S. market through private label sales gave them a strong distribution arm, and they continued to make serious investments in creating a massive brand franchise and distribution capability.

By 1970, the Japanese had closed the gap with the U.S. in color television production, and by the

end of the decade were firmly entrenched on our home turf.

How can U.S. manufacturers win against this kind of formidable competition?

Our first response has been to fight them through imitation and

cost-cutting maneuvers: offshore production and quality circles — while playing catch-up at modernizing production processes.

The second response has been to withdraw from low-end product and manufactured goods markets

in an effort to concentrate on supplying services instead. Still a third response has been to put the onus on the government to restrict trade.

None of these responses will turn us into global winners. We can and must learn from the Japanese, particularly in the areas of manufacturing process technology, and we must be careful not to fall behind, simply becoming followers.

Instead of walking away from this imminent competitive challenge to our worldwide dominance, we need to face it squarely.

Before we lose an entire market at the low end, we need to be responsible for driving its next stage of development. We must play this global game differently than the Japanese.

As a country, we have always relied on an abundance of resources and our own resourcefulness to win. These characteristics will continue to serve us well in the future.

However, to win globally requires a long-term view of profitability based on market share, not the quarter-by-quarter thinking dominant in U.S. business today.

We must fully recognize that in order to protect our domestic markets, we have no choice but to become global players and compete on a much broader turf. To win in this emerging competitive environment requires a broad product scope and economies of scale achievable only on a worldwide basis.

From the perspective of a data communications vendor, the way to become a long-term winner in a worldwide marketplace is by forming a strong alliance with our customers — by really listening to our customers' needs and offering not simply a product but a cost-competitive solution.


First and foremost, customers need solutions to assist them in optimizing their communications networks to their own strategic advantage. Customers need ways to enter a marketplace first, rather than following the pack.

To provide this strategic alliance for the customer at a competitive price requires nothing less than expertise in product design and advanced manufacturing. Gaining that expertise can come by means of strategic partnerships with vendors, including the Japanese.

Witness Motorola, Inc.'s recent announcement of an agreement with Toshiba to share specific microprocessor technology and to jointly develop specific products. What is significant about this accord is that no technology will be exchanged until Toshiba assists Motorola in achieving a specific share in Japan.

Product innovation is crucial, but the key to longer term success is the ongoing relationship with the partner.

It is a partnership that requires giving the customer, rather than the vendor, control over the network. It is a partnership dependent on the provision of both low-end products and high-end networking solutions.

Certainly it is a partnership that hinges on quality — both in products and in service. 

*“We can and must learn from the Japanese, particularly in the areas of manufacturing process technology, and we must be careful not to fall behind, simply becoming followers.”*

## WILL YOU CHOOSE THE WIDE-AREA NETWORK YOU CAN RELY ON TIME AFTER TIME?

If the private wide-area network you select isn't reliable, it isn't anything. That's why it's comforting to know that ever since BBN Communications built the first wide-area packet-switching network in 1969, our systems have delivered an enviable record of availability—on the average, 99.99%.

The reason is simple. BBN networks are fail-safe. If a telecommunications line goes down, our packet switches automatically find an alternate route, and the change is completely transparent to the user.

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Both our alternative routing approach and our Network Operations Center are unique strengths of BBN Communications. Together they represent a commitment to reliability that convinced major corporations like MasterCard and Wang to choose BBN as their private wide-area network company.

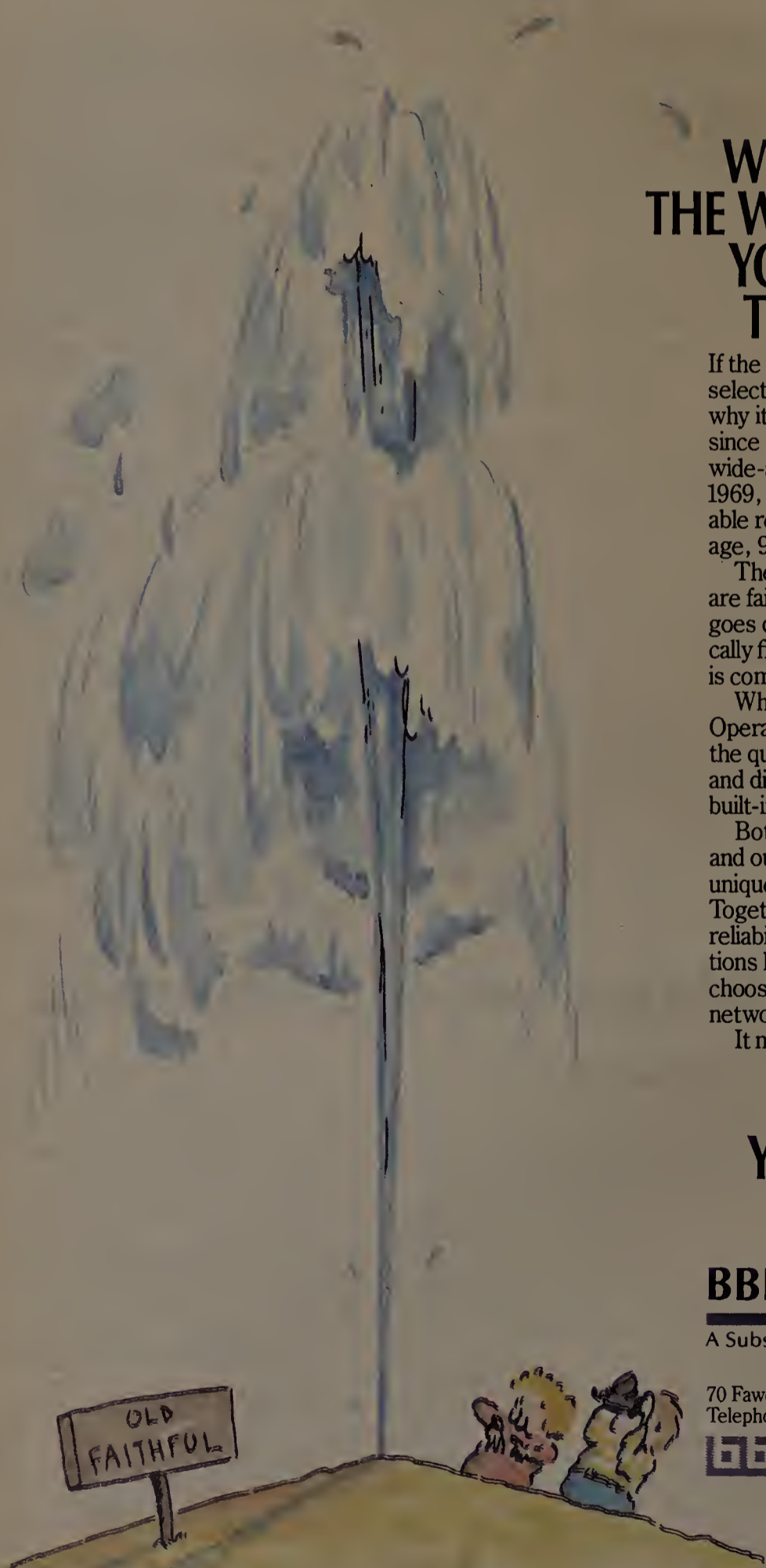
It may well be the reason you should, too.

## SHOULDN'T YOU BE TALKING TO BBN?

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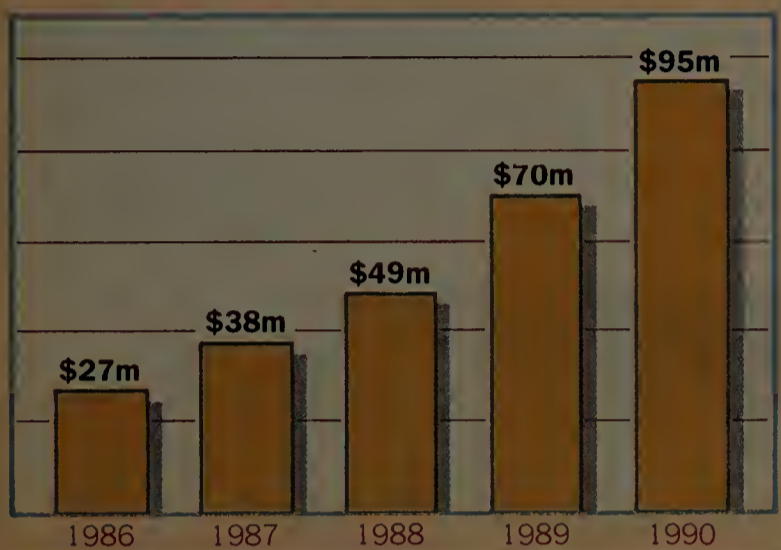
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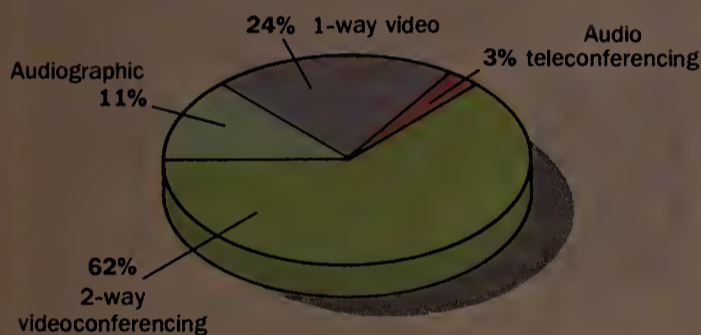


# TELECOM TRENDS

## Two-way, full-motion videoconferencing gear market



### Teleconferencing market by application in 1990\*



\* Total teleconferencing revenues projected at \$1.6 billion.

SOURCE: FROST & SULLIVAN, INC., NEW YORK

## ITT unit debuts voice/data/fax service

ITT Communications Services Group's long-distance telephone service unit — United States Transmission Systems, Inc. — introduced an all-digital, end-to-end, private-line service for voice, data and facsimile communications. The service, currently available to support transmission speeds of 56K bit/sec or 1.544M bit/sec, is offered over a combination of fiber-optic cable and digital microwave transmission media.

Initially available in 28 cities, the service carries a \$1,500 one-time installation charge for a 56K bit/sec line and a \$2,500 charge for installation of the 56K bit/sec link.

## WANG COMMUNICATIONS, INC.

# WCI drafts new bypass game plan

*Wang subsidiary takes "sell then build" tack.*

BY BOB WALLACE

Senior Editor

LOWELL, Mass. — Wang Communications, Inc. (WCI), a T-1 network operator and a provider of point-to-point T-1 links, has reversed its network construction plans in an effort to avoid being squeezed out of this capital-intensive market.

WCI scrapped its original "build first, sign users later" business plan, opting instead to interest users in high-speed networks before actually constructing the systems for them. This marketing switch has extended WCI's life in a highly competitive marketplace.

WCI currently operates private intra-LATA nets in Boston, Chicago, Los Angeles and San Francisco. In a radical departure from its early ways, WCI maintained it will not build additional systems until it convinces users to contract for capacity on these nets.

In a recent interview with *Network*

*World*, WCI founder and Wang Laboratories, Inc. Vice-President Courtney Wang delineated WCI's business plan about-face.

"When we first started," Wang said, "we felt we had to establish credibility by building systems in some major cities. Our direction, however, has changed significantly since 1984. Now, we are looking for a user that is willing to sign a contract for high-speed transmission services before we build the system. This reduces [WCI's] financial risk."

The list of what were termed bypass-service providers after the divestiture of AT&T has been trimmed in the past few years.

WCI offers users an alternative means of connecting their locations to the long-distance carriers' points-of-presence. Wang ranked this application as the most popular use of T-1 links. He said the users' need to connect geographically dispersed local-area nets is also an application that would

See **Wang** page 14

## INTELLIGENT NETWORK

# BOCs at work building network of the future

*Distributed control net due by end of '88.*

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — The Bell operating companies have begun work in preparation for their so-called intelligent network of the future and expect to have the network, and the advanced services it will support, ready for users by the end of 1988, Bell Communications Research, Inc. officials said at a recent press conference here.

The aim of the BOCs' efforts is to distribute intelligence, or control, throughout the network, even to the customers' premises. That distributed intelligence will enable the BOCs to offer new services and portends greater flexibility for users in configuring those services to meet their needs.

BOC 800 service will be the first application to make use of the intelligent network, Bellcore officials said. It was selected because 800 service is big business with cus-

tomers base increasing 10% and call growth increasing by 20% annually.

BOC 800 service will enable customers to select one or more carriers while using a single 800 number. Users will be able to have the same number for multiple long-distance carriers. Currently, a customer must have a unique 800 number for each carrier he uses. At present, the three digits following the 800 number, commonly referred to as the NXX number, signify which carrier is transmitting the call.

When the intelligent network is in place, users will be able to program the BOC switch from the customer site, in order to change the routing of 800 calls from one long-distance carrier to another, according to Richard B. Robrock, assistant vice-president for network services at Bellcore, the research and development arm of the BOCs.

The user-programmable feature See **Intelligence** page 12

## CROSS TALK

BOB WALLACE

# Fear not variety, Milquetoast managers

**F**or many telecommunications managers, variety is not the spice of life.

Fearful of injecting any element of risk into their telecommunications services planning, these managers have opted to stick with AT&T and the local Bell operating companies as opposed to venturing out into the competitive market.

Although numerous carriers have entered either the intra-LATA or long-distance services free-for-all, many telecommunications managers have maintained the telecommunications status quo and refused to even experiment on a circuit-by-circuit basis with long-distance carriers other than AT&T or short-haul carriers other than the local telephone companies.

The phrase "nothing ventured, nothing gained" means nothing to these managers, who

seem to fear that entrusting any aspect of their communications network to a carrier other than AT&T may result in a career change.

One California-based user, who requested anonymity, confessed that although AT&T is the company's preferred carrier, he also experiments liberally with other long-distance carriers' services. The incentive behind this action, which many might term daring, is to determine the qualities of service offered by what are referred to generically as the other common carriers.

"We are experimenting with long-distance voice circuits from both MCI and [US] Sprint to determine the quality of the lines," the user explained. "If, for some reason, we aren't satisfied with these carriers' lines,

See **Experimenting** page 13

# ON AT&T'S "HIGHWAY 3B" THERE ARE NO LIMITS ON WHERE YOU CAN GO WITH COMPUTERS.

Like it or not, the multi-system environment is here to stay. Mainframes will be mainframes. PCs will continue to proliferate like mosquitoes. And user needs will change every day.

It is high time somebody created a family of computers for an evolving mixed-system environment. The time is now. The "somebody" is AT&T.

Our 3B computer family is among the first to blend the technologies of data processing and communications. Result: a unique ability to distribute processing



power across system lines, from user to user, desktop to department, and department to mainframe.

AT&T's 3Bs are easily linked *up* to IBM\* mainframes and *down* to any combination of terminals, peripherals, and MS-DOS\*\* PCs. The idea is to open communication between



#### COMPUTERS WITH THE FUTURE BUILT IN

**3B2/310.** Supports up to 14 users, 18 RS232C ports. Speed: 1.1 MIPS, 32 bits at a time. *All 3Bs are 32-bit machines.* Storage: 86MB internal hard disk; up to 516MB with Expansion Modules.

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**3B2 XM.** Expansion Module adds 23MB cartridge tape storage and/or 30 to 72MB hard disk storage.

**3B15.** Serves 16 to 60 users, 128 RS232C ports. Speed: 1.6 MIPS. Supports 8 drives, with maximum storage of 2.7 *gigabytes*.

**Not shown:** Other members of AT&T's 3B computer family serve up to 100 users, across a wide range of business needs and environmental conditions.

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systems—without forcing users to give up the applications they know and trust.

In most offices, the effect on productivity is electric.

### **"THESE GUYS THINK OF EVERYTHING."**

The 3B's role in a distributed data processing environment can grow and change as your business evolves. For starters, UNIX™ System V permits the same software to run on a variety of machines, protecting your investment in applications and user training.

On the hardware side, the whole 3B family is like a big set of building blocks. Everything is modular. A system of feature cards and interfaces makes it easy to add functions or peripherals. Or add users. Or boost performance. Or all of the above—in any order, at your own pace.

*Example:* A 3B "starter" system that is cost-efficient for 6 users can easily grow to serve 60 users—and more—with the same efficiency. By networking 3B to 3B you can support *thousands* of users—like adding beads to a string.

Whether those "beads" are down the hall or an ocean away, AT&T's networking tools can swiftly unite them all into a single, flexible, responsive system.

### **WHERE ARE YOU GOING?**

AT&T's 3B family was created *as a family* to enhance the systems you have today, without imposing limits on where you can go tomorrow.

You can start with the pieces you need to solve today's problem: linking mainframe and desktop, say; or pulling together a department. As your needs and ambitions change, so can your system. AT&T makes the pieces fit.

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\*IBM is a registered trademark of International Business Machines Corp.  
\*\*MS-DOS is a trademark of Microsoft Corporation.



# **AT&T**

## **The right choice.**

## ▶ WESTERN UNION

# EDI eases Easylink order entry

*Service seen as paperless portent.*

BY BOB WALLACE  
Senior Editor

WASHINGTON, D.C. — Western Union Corp.'s recently announced Electronic Data Interchange (EDI) enhancement for its popular Easylink electronic mail service will enable medium and small users to streamline their order entry processes.

Western Union said it will begin to offer EDI service across the carrier's packet-switched network in 1987. EDI is a means of exchanging intercompany business documents and information from computer to computer.

The introduction of EDI-compatible services is expected eventually to usher in the age of the paperless transaction. Use of EDI services will enable users to minimize the time and labor required to enter purchase orders into a company's product manufacturing system.

EDI services will benefit numerous vertical markets. Manufacturers such as General Motors Corp. and Ford Motor Co. stand to gain the most from these services because EDI will enable them to draw outside parts makers and dealerships closer to their production processes.

Mark Winther, director of new communications services for the New York-based Link Resources Corp., a communications marketing and research firm, claimed EDI will simplify methods of ordering goods and services while minimizing the potential for error in this process. "A customer usually cuts a purchase order for an item and mails the order to the vendor company. An administrative worker may then enter the order into the company's accounts receivable system," he explained. "The order is then sent to the company's production system."

Winther said EDI services would enable those wishing to order products from a manufacturing company to enter the order electronically. Winther maintained the strategy behind Western Union's planned EDI service is to migrate primarily medium and small users of the vendor's Telex service to the EDI offering.

Vendor companies will be able to save time and decrease reliance on administrative personnel who, in many cases, currently enter orders into the computer system manually, Winther concluded.

Vendors will be able to use EDI services to improve business relationships with both materials suppliers and potential customers, Winther added. ▢

## Intelligence from page 9

of the 800 service will allow customers to choose, for example, one long-distance carrier in the morning and another in the evening. Customers may use one carrier for calls originating in California and a second for calls originating in Texas. They can select a carrier by time of day, day of week and location of calling party.

BellSouth Corp. claimed it will be the first company to begin offering BOC 800 service. BellSouth has established a test site at an inactive central office in Chattanooga, Tenn. A successful BOC 800 call was placed from Atlanta and routed through the Chattanooga office in November, according to Douglas Hursey, BellSouth's service staff

manager for service planning.

BellSouth expects to have BOC 800 service widely available in Tennessee by the end of 1987. The other BOCs have not indicated a timetable for implementation.

Within the intelligent network, call handling will no longer be limited to switches, Robrock said. Calls that require special handling, such as 800 calls, will be intercepted at the local switch and routed to a service switching point (SSP).

The SSP sends a request for additional information through a signaling network to the brain of the intelligent network, the service control point (SCP). The SCP works in tandem with an off-line data base called the service management system which contains all customer

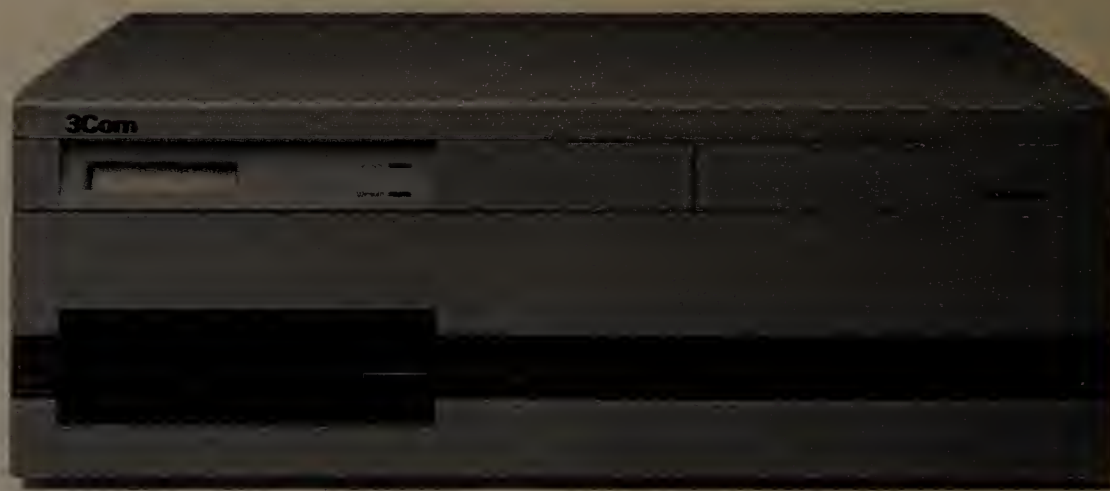
service information. The information needed to route the 800 call is collected and sent back to the SSP, which hands the call off to the appropriate interexchange carrier.

The intelligent network will use Signaling System 7, an internationally approved network protocol that uses out-of-band signaling to route calls.

Signaling information is transmitted over a channel that is separate from the channel used to send the actual customer call. Integrated Services Digital Network also uses out-of-band signaling for setting up and routing calls.

Services expected to be introduced later are alternate billing of credit card calls, virtual private networks and wide-area Centrex. ▢

# We play hard.



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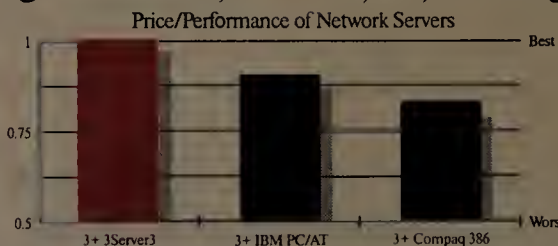
Now they're saying the same about our 3+ software.

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Of course, for maximum performance, we suggest you team our 3+ software with a

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And the pair delivers a price/performance figure other combinations can't touch. At \$5,995, a 70-megabyte 3Server3 costs far less than a similarly configured PC/AT or Compaq 386. In fact, you can add a 3Server3 and an IBM PC workstation to your network and still come out dollars ahead.



\*Belmont Laboratories, Belmont, California: 3+ Version 1.1 on a 70-megabyte 3Server3; 3+ Version 1.1 vs. Advanced Netware 286 Version 2.0A on PC/ATs with 3 megabytes memory, internal hard disk.

► REGULATORY REPERCUSSIONS

# Greene action to shape future RBOC bid efforts

WASHINGTON, D.C. — A recent decision by U.S. District Court Judge Harold Greene is likely to have an impact on how the regional Bell operating companies bid on the Federal Telecommunications System (FTS) 2000 contract and future private network contracts.

Greene ruled in late November that US West, Inc. violated the Modified Final Judgment and discriminated against AT&T when it offered to provide the federal gov-

ernment local access facilities for the FTS in the RBOC's region at rates below what AT&T charged for similar service.

The decision is a result of an emergency motion filed by AT&T on Nov. 6. AT&T alleged that US West violated the nondiscrimination provisions of the Modified Final Judgment.

The Department of Justice found that US West replaced AT&T as the provider of the interexchange

switching that is necessary for the operation of FTS in four cities in the Mountain Bell territory.

AT&T charged that US West accomplished this by engaging in unlawful discrimination in the provision of access services. AT&T alleged that US West told the General Services Administration (GSA), which oversees the FTS, that it could get lower rates for access to the local network if it purchased the necessary switching services from US West, rather than from AT&T or another carrier.

In addition, AT&T claimed that US West offered to provide the GSA with dedicated trunk groups at no charge, but US West required AT&T to pay for such facilities.

US West claimed the pricing dis-

parity was legal because of different access costs charged for its switching service (Centrex) and AT&T's switching service (Common Control Switching Arrangement or CCSA) under federal and state tariffs.

"This argument is so lacking in merit as to be frivolous," Greene said. "US West can no more hide behind the tariffs it is filing with federal or local regulators than the Bell System could hide behind such tariffs when charged with violations of the antitrust laws."

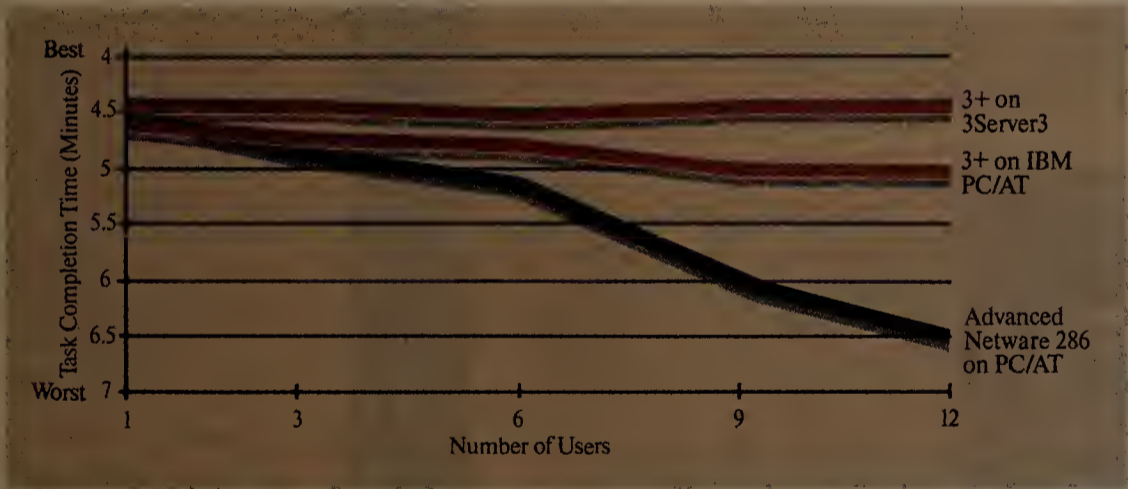
Greene ordered US West to provide exchange access and other local exchange facilities at the same rates for the FTS as well as for other private network bids, regardless of which long-distance carrier the customer selects to provide switching functions.

This means US West must strictly adhere to existing local access tariffs when quoting costs in response to users' private network requests for proposal. He also ordered US West to make public all rates quoted in future FTS bids.

The decision is seen as significant in light of upcoming bids for other interagency government nets for the replacement of the current FTS with a new, digital network.

All of the RBOCs are expected to bid on the FTS upgrade project. The message to be drawn from this scenario is that Greene will not allow unfair pricing in future FTS bids or any other private network bids. FTS is a private network providing long-distance communications to federal government agencies around the U.S. The ruling should help AT&T continue to compete for the local access portion of FTS calls. Greene's decision helps maintain a competitive telecommunications marketplace costwise. It also requires the RBOCs and other common carriers to compete by providing technologically superior services. ▮

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**Experimenting from page 9**

we can always go back to AT&T. They would be more than happy to handle our business."

The user said he did not view this experimentation project as a bold or potentially dangerous undertaking.

"If you don't give some of the other carriers a shot, you will never know if the claims they make about the quality or prices of their services are accurate or not," he asserted.

Users are beginning to accept carriers other than AT&T on more than a circuit-by-circuit basis. Honeywell, Inc., Sears Communications Network, Inc. and Unisys Corp. have all been successfully wooed by US Sprint Communications Co. All three of these users were looking to either supplement or replace services provided by AT&T.

Reading of the actions of their peers, users reluctant to experiment with the services of any of the numerous long-distance carriers may be prodded into action. Telecommunications managers should not be afraid to test the competitive waters. ▮

## TELECOM TIDBITS

The **National Telecommunications Network (NTN)**, a consortium of seven regional carriers operating primarily fiber-optic cable systems, released its latest network construction figures. As of Nov. 30, NTN had completed 72% of its planned 11,951-mile coast-to-coast, long-distance network. Over 120 of the 158 cities the network will serve are said to have operational networks. NTN is a joint venture partnership of seven companies: **Consolidated Networks, Inc., LDX Net, Inc., Litel Telecommunications Corp., Microtel, Inc., SouthernNet, Inc., Southland Fibernet and Williams Telecommunica-**

**tions, Co. Sales/Teleconnect.**

**NCR Comten, Inc.** announced that its Comten X.25 Interface to Packet Switched Systems has met compatibility standards for use with **AT&T's** Accunet Packet Service. Users may now connect Comten 3600 and Comten 5600 communications processors and their associated terminals to AT&T's packet-switched net.

**New Jersey Bell** recently asked the New Jersey Board of Public Utilities for permission to offer **Class Calling Service**, a family of seven advanced calling features. If

approved, the new service will be introduced in Atlantic City and in the Hudson County area early in 1987. The service, designed for users with one to five lines, would be offered statewide in 1988. Four of the seven features: **Return Call, Call Block, Call Trace and Identical Call**, could reportedly be used to thwart annoyance callers and reduce unwanted sales solicitation calls. Pricing for the features would begin at \$8.50 per month per line for the initial feature, and at \$2 per month per line for each additional feature. **Call Trace**, however, would be priced at \$5 for each time a user used the service. □

**Wang from page 9**  
utilize T-1 links.

WCI is working to persuade large users to ditch the local telephone companies as the favored provider of local access service. Wang claimed this tall task is made more difficult by some telecommunications managers' unwillingness to jilt the local telephone companies.

"There are telecommunications managers who say they can't get fired for buying the local telephone companies' services," he said. "We face a tough situation when we encounter a manager who is not secure with his position or doesn't want risk in his environment."

Wang claimed bidding against the local telephone company for a user service contract has been tough sledding because, he explained, many users will choose to maintain the telecommunications status quo and award contracts to the local telephone companies.

To overcome this critical situation, Wang has focused its efforts on maintaining user satisfaction with WCI services. "Telecommunications is a big business," he said. "But this business is made up of a small community of people who talk amongst themselves. Our company's credibility is based upon what these telecommunications and MIS managers say."

Winning over users will also require carriers such as WCI to invoke creative marketing strategies to attract these users to their services. "We have to do everything we can to reduce the [telecommunications managers'] perceived risk of doing business with someone other than [the local telephone companies]," Wang explained.

Offering fixed-term service contracts, an increasingly popular option for users, will help WCI close the deal with some users. "Users claim fluctuating local access fees make financial planning for telecommunications services extremely difficult," he said. "[These users] want to lock in the service prices for three or more years. They don't want to have to go back to their financial people and say, 'There was a service rate hike. We need more money,'" Wang commented.

The WCI chief executive officer also spoke of the pros and cons of being a subsidiary of the diversified Wang Laboratories, Inc. He said both WCI and Wang leverage each other's expertise in an attempt to vend multifaceted communications systems. "We don't want to be viewed as simply a T-1 commodity provider," Wang explained.

"It's a two-way street. There are instances where we will visit a user looking for communications links and discover they need data processing equipment or [telecommunications gear]," Wang related. In addition to its word processing systems efforts, Wang Labs owns a portion of private branch exchange maker Intecom, Inc., and it owns PBX producer Telenova, Inc.

Although reference sales identified by Wang Labs aid WCI, Wang said the popularity of the parent company as strictly a computer company overshadows the identity of WCI. □

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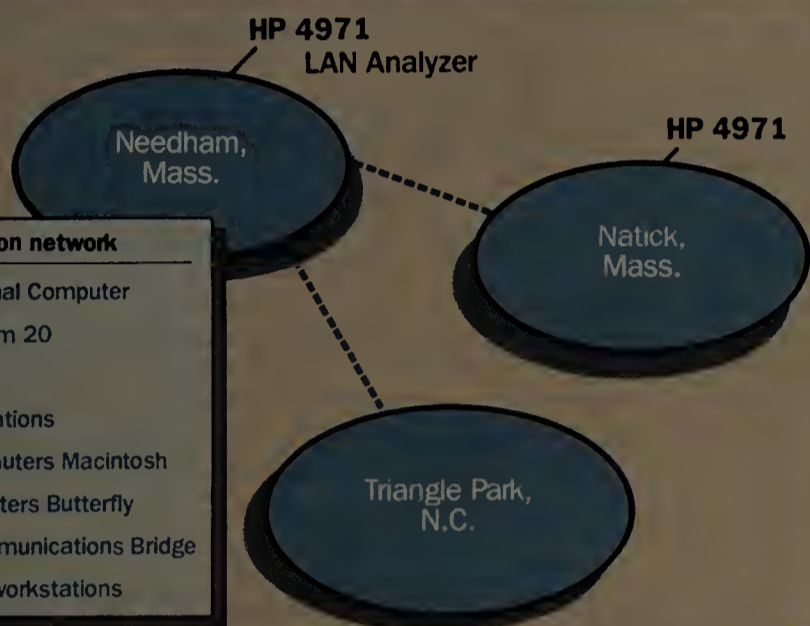
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# DATA DELIVERY

## Hewlett-Packard helps GTE manage multivendor LANs



SOURCE: GTE BUSINESS COMMUNICATIONS SYSTEMS, INC., NEEDHAM, MASS.

## Understanding TCP/IP

The TCP/IP Interoperability Conference is scheduled for March 16-19 in Monterey, Calif. The conference has been designed to promote understanding of the Transmission Control Protocol/Internet Protocol suite of protocols. A preconference schedule of full-day tutorials are priced at \$275 each. Registration for the conference costs \$750. Attendees registering early receive a discount. For more information, call Advanced Computing Environments at (408) 996-2042.

### ► GROWING PAINS

## HP tool helps GTE control net

*Analyzer monitors TCP/IP and XNS.*

BY PAUL KORZENIOWSKI  
Senior Editor

NEEDHAM, Mass. — At GTE Business Communications Systems, Inc., located here, the network evolved more quickly than did the tools needed to manage it, prompting the company to beta test a local net analyzer introduced earlier this year by Hewlett-Packard Co.

GTE's Ethernet network grew

from a local-area network connecting a few Digital Equipment Corp. System 20s in one building to a 1,500-port system supporting a hodgepodge of equipment spread across three buildings and two states.

An IBM mainframe, IBM Personal Computers with networking equipment from 3Com Corp., Symbolics, Inc. workstations, BBN

See **GTE** page 16

### ► SOFTWARE

## HP enables PC to share with 3000

*Disk and files can be passed.*

BY JIM BROWN  
New Products Editor

PALO ALTO, Calif. — Hewlett-Packard Co. introduced packages that allow personal computers to share Series 3000 minicomputer disk storage and data base files.

The HP Resource Sharing and HP Information Access packages round out HP's suite of Series 3000 minicomputer-resident Personal Productivity Center software. The software ties IBM Personal Computers and compatibles, including HP's Vectra PC, to Series 3000 minicomputers.

In essence, the packages make a Series 3000 minicomputer act as a file and print server for personal computers connected to it over Ethernet-, Starlan- or RS-232-type connections.

"We're really trying to make the PCs an active part of the network rather than just terminals with emulation capabilities," said Royce Murphy, product manager.

The packages fall under the office services banner of the Personal Productivity Center, which includes the HP Deskmanager package.

Also included is HP's Advancemail package, which lets personal computer users interact with terminal users attached to the same Series 3000 minicomputer. The Personal Productivity Center also provides word processing, graphics and spreadsheet applications.

HP, Murphy said, uses Microsoft Corp.'s MS-NET local-area network-compatible software to tie personal computers to each other as well as to the Series 3000 minicomputer.

The Series 3000 minicomputer manager sets up the parameters of the network that works with the personal computers and their MS-NET software, he said.

HP Resource Sharing lets personal computers connected to a Series 3000 minicomputer share Series 3000 minicomputer disk space, printers, applications and tape drives. The HP Resource Sharing package creates a virtual disk on the Series 3000 that will store files in personal computer

See **Software** page 16

### DATA DIALOGUE

PAUL KORZENIOWSKI

## Data dialogue ditties

**S**omething up my sleeve. Amdahl Corp. is reportedly putting the finishing touches on a new line of front-end processors.

For the last few years, the company's product line has been lagging behind competitors such as NCR Comten, Inc. and IBM.

Unlike NCR, Amdahl manufactures IBM clone front-end processors. Amdahl's front-end processors actually run the same front-end processor operating system software that IBM devices run. In fact, Amdahl licenses the software from IBM.

Amdahl's current model mimics an IBM 3705, a device that IBM no longer manufactures. Two items have prevented Amdahl from keeping pace with Big Blue.

When the 3725 was announced, IBM took steps to make sure it would be difficult to copy. Items that were once part of the front-end processor software were integrated into the guts of the machine.

Also, IBM sued Amdahl over patent infringement. After the case was settled out of court, Amdahl engineers spent extra hours to make sure similar legal problems would not arise.

The largest portion of Amdahl's customer base consists of mainframe buyers who want both a front-end processor and a mainframe from the same company. So it hasn't been critical for Amdahl to supply leading-edge technology. But that shortcoming has cost the company sales and market share.

Amdahl's new line is expected to debut during the first quarter of 1987.

Analysts speculate that the company may offer X.25 and T-1 interfaces to differentiate the products from the 3725.

**Keeping the ball rolling.** Network Equipment Technologies (NET), a start-up T-1 manufacturer in Redwood City, Calif., is putting the finishing touches on a low-end T-1 multiplexer.

The company has carved out a healthy niche in the high end of the market. The new device will enable NET to compete with the point-to-point multiplexer vendors at the low end.

In preparation for its public offering ("T-1 firm plots stock sale," NW, Oct. 27), NET prepared a booklet that serves as an annual report. By September 1986, the company had installed 36 private networks and shipped 240 T-1 multiplexers.

Customers include American Airlines, Inc., American Express Co., Bankers Trust Co., Wells Fargo & Co. and the Department of Defense. Financial and insurance companies accounted for 36% of the multiplexers sold and 44% of the company's revenue.

NET's revenue for the fiscal year, which ended on March 31, was \$8.6 million. In the following quarter, revenue was \$6.7 million.

**Where LANs and DISOSS meet.** In 1986, almost every major office automation supplier announced some sort of support for IBM's DISOSS, an electronic mail and library services application that runs under CICS.

See **Ditties** page 16

### Software from page 15

A software utility at the minicomputer level will convert the personal computer format to a Series 3000 format if a Series 3000 terminal user wishes to access the file.

Previously, users had to convert personal computer documents to Series 3000 format in order to store them on a Series 3000 disk, Murphy said. The file then had to be converted back to personal computer format before being downloaded.

The HP Information Access, an enhancement to HP

Access, allows personal computer users to format and request local and remote records stored under HP's Image data base package. Once the data is located on the minicomputer, it is formatted for personal computer use and downloaded to the personal computer. The data can then be used in such programs as Lotus Development Corp.'s 1-2-3 spreadsheet, Ashton-Tate's dBase II and Microrim, Inc.'s R:Base 5000.

HP Information Access also has a built-in report generator that allows personal computer users to cre-

ate and save routine reports. In addition, the package will calculate the time required to complete a data base search, and it will track the progress of the job.

An HP Information Access package supporting 10 personal computers ranges from \$5,900 to \$12,500, depending on the Series 3000 minicomputer model.

The HP Resource Sharing package supporting 10 personal computers ranges from \$4,800 to \$9,500, also depending on which Series 3000 minicomputer model is used. □

### GTE from page 15

Computer Corp. parallel processing mainframes and Apple Computer, Inc. Macintoshes have been added to the local net. The original network in Needham has been linked with other nets in Natick, Mass., and Research Park, N.C.

The growth brought welcome capabilities to GTE users but created a problem for Steven Leidan, senior member of the technical staff at the company.

Leidan's job is to oversee the network, but he lacked tools for managing and controlling it and planning for its growth.

Leidan's search for a network management tool was hindered by the fact that the network supported three communications protocols: DEC's Decnet, Transmission Control Protocol/Internet Protocol (TCP/IP) and Xerox Corp.'s Xerox Network Systems (XNS).

He was happy with the tools that DEC supplied to manage Decnet, but he needed a package to monitor data using the other two network protocols.

Most vendors sold network management equipment that worked well with their own equipment, but they did not support any other protocols. Last spring, Leidan began searching for an analyzer that could be used with both TCP/IP and XNS.

HP's 4971S local-area network analyzer and Excelan, Inc.'s Nutcracker both fit the bill. The products are stand-alone microcomputers with network management software and adapters, enabling them to be attached to an Ethernet network.

The devices are equipped with software that can cap-

ture and store packets of data so that a network manager can analyze them.

In July, after evaluating both devices, GTE chose to beta test and subsequently to purchase the HP 4971S unit.

Leidan chose the HP product because it enabled him to test network response times as well as various connections. Another feature Leidan liked about the product was that it was easy to program.

However, the HP 4971S has a few limitations — some of which HP has said it will address. With this analyzer, Leidan can examine how well a terminal server is performing, but he is unable to monitor a specific port. Also, he said he would like a statistics package so he could collect information about the performance of items on the network and later manipulate that information.

The HP 4971S has helped Leidan locate a variety of network problems. For example, the company was experiencing response time problems with an XNS portion of the net. Leidan's crew used the HP product to analyze the data being sent out over the network.

XNS was supposed to send acknowledgement information along with transmitted data. But Leidan found that the acknowledgement information was not being sent with the data. His staff is working to rectify the problem and increase network response time.

Leidan said the analyzer is used between 10 and 15 hours a week to fix such problems. GTE was so pleased with the product, a second local net management package was purchased and installed at the Natick facility. □

### Ditties from page 15

In 1987, many major local-area network vendors are expected to follow a similar course.

A problem may emerge with the new products. Not only will there be many electronic mail packages, but there will a smorgasbord of ways to link these packages. IBM is pushing DISOSS as its central solution.

The International Standards Organization is hyping X.400.

Vendors such as Soft-Switch, Inc. have proprietary products that link these packages.

Users will soon be faced with decisions of not only choosing among different electronic mail packages but also of determining which ways they want to link these packages together.

Oh, joy of joys.

ATM wars. While users

grapple with the issue of how to tie electronic mail systems together, banks are trying to determine how to link automated teller machine (ATM) networks.

Now that many banks have covered their immediate operating areas with ATMs, they are trying to increase the reach of their networks.

In California and New England, banks have formed cooperatives that run networks linking close to half a dozen banks' ATM machines onto a single network.

National networks are also growing in size and scope.

Network planners are now trying to determine what is the best way to meet their customers' needs for ready cash.

Some have joined three, four or even five networks to make sure their customers will be able to receive needed cash while travel-

ing.

Bank network planners would like to install and run their own nationwide networks. That would enable them to better control the network and charge other banks for use on it.

Currently, transaction costs are too expensive for even the country's largest banks to run their own networks.

Only when a bank can process a transaction for about a nickel will costs be low enough.

Right now, processing a transaction costs approximately 21 cents. Competition is heating up, and eventually it will force that price down.

Whether or not processing charges will drop to a nickel is not clear.

**My dog ate my homework and other poor excuses.** Ever go to a conference to see a certain speaker, only to discover that the person does not show up?

Often, the organization sponsoring the conference is blamed for the no-show.

Peter Shaw, conference director at Online Conference, Inc., which is based in New York, said that scheduled speakers often call him at the last minute and tell him they cannot show up.

Shaw said he realizes last-minute items can come up, but he said he thinks that many such excuses are just that — excuses.

He said some people are afraid of speaking in public and as their speaking debut approaches, their anxiety level rises.

Rather than face the problem head-on, they opt for an easy out, and the conference sponsor shoulders much of the blame.

Shaw said he would appreciate it if future speakers would decide whether they have the confidence to speak in public before he adds their names to a program. □

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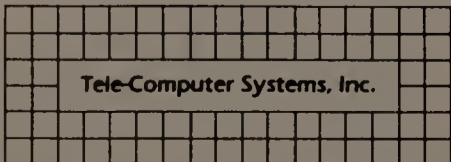
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# LOCAL NETWORKING

"I have a love-hate relationship with Novell. I love their product but I hate their support."

**James F. Poli Jr.**  
Operations manager  
Satellite TV Services  
Newton, Mass.

## ► INTERVIEW

# Banyan chief speaks on server technology

*Mahoney discusses new capabilities and configurations.*

Banyan Systems, Inc. has brought a different perspective to the local network marketplace by drawing much of its management and ideas from the minicomputer industry. The three-year-old Westboro, Mass., company's Virtual Networking Systems (VINES) concept emphasizes internetworking of microcomputer local networks with minicomputer and mainframe environments.

Banyan's server is built around a Motorola, Inc. 68000 microprocessor and uses a Unix-based network operating system. Besides Banyan networks, the device sup-

ports networks from multiple vendors and enables attached devices to access other processor environments through terminal emulation.

Network World West Coast Correspondent Mary Petrosky interviewed Banyan President David Mahoney, a veteran of Data General Corp., about trends in local network servers at the recent Localnet '86 conference in San Francisco.

**How do dedicated, proprietary servers compare with personal computer and minicomputer-based network servers?**

Many things can act as network

servers — any system that provides a generalized resource management environment and has the ability to provide communications as well.

An IBM Personal Computer AT is very good as a low cost, good performance, departmental server. But when you start to add communications links from an AT to minicomputers, mainframes or a second network, slowly but surely you run out of capacity. It's limited in terms of the number of slots and flexibility it has to add physical network interfaces or communications interfaces, as well as storage.



David C. Mahoney

A level above the AT are proprietary servers — such as our systems and those from Novell — which have been designed to be servers. You want more in your server than what you can get out of your standard desktop computers, such as a flexible bus architecture and more emphasis on bus-level throughput and capacity.

A server has to handle a number of different communications tasks, things you would normally do in a gateway. You want to be able to add incremental storage, have tape backup capability and some level of reliability, such as a battery backup to protect against power failure. You can't get those out of a standard, off-the-shelf IBM PC AT, only from a dedicated server.

A level above the dedicated server is the departmental server, a general purpose minicomputer. It shares a lot of the same characteristics as the dedicated server, except it doesn't support as many networks. That's because very few departmental minicomputers have an IBM PC bus, so every new network interface has to be interfaced to a proprietary bus.

That's very expensive, and you don't have a lot of flexibility. Basically, minicomputers are terminal-oriented and not network-oriented, so they provide excellent facilities for integrating dumb terminals but not very good facilities for integrating PCs.

**How will minicomputers compete with the microprocessor-based servers?**

Minis will be enhanced to add some level of PC connectivity, allowing a PC to be more than a terminal. Over time you'll see manufacturers doing something similar to what DEC has done by adding things like file-sharing capability. But we're assuming the minicomputer will still

See Banyan page 18

## LANMARKS

JOHN DIX

## Micro LANs: weighing the potential

**P**ersonal computer local networks are still an afterthought. They are typically brought in to enable existing micro users to share an expansion disk or a printer.

Although that is changing slowly, even today local networks are not usually considered an alternative to mainframe and minicomputer solutions to business needs.

But consider the potential.

Personal computers can today already process 500,000 instructions per second. Micros built around Intel Corp.'s new 80386 microprocessor will be capable of processing up to 4 million instructions per second and addressing gigabytes of memory.

To put it in perspective, consider that 20 years ago the first large-scale computer, the Electronic Numerical Integrator and Computer, covered 15,000 square feet of floor space, weighed 30 tons and was only capable of doing 357 multiplications per second.

Harnessing the power of the new desktop powerhouses through networking will provide the equivalent of a mainframe on a string.

And it's cheap.

Personal computer networks can satisfy some applications for a fraction of the cost of other options. This is evident in the young desktop publishing industry. Traditional minicomputer-based text processing systems are being threatened by micro systems outfitted with sophisticated application software and high resolution, laser printing systems.

The cost of the desktop system may be \$50,000, compared with \$100,000 or more for traditional minicomputer-based systems.

Besides price, application-specific personal computer networks are also appealing because they can help alleviate the application backlog — which can run up to two years — users are faced with when they ask MIS to provide mainframe or minicomputer solutions to business needs.

But local networks have their drawbacks. It would raise havoc to install application-specific networks whenever a new need springs up. While satisfying short-term needs, the mix of systems installed under that approach would create mainframe-sized headaches down the road

when interoperability became a network requirement.

Perhaps more importantly, the software needed to satisfy application-specific needs is often lacking or simply not available for networks yet. Network data base management systems, for example, are still being run through their paces. Data concurrency, the manner in which data is kept up-to-the-minute and corruption is prevented, is still a nagging network problem.

Besides operational problems, upper management must calculate the ramifications of allowing departmental users to migrate to personal computer network solutions in light of investments made in other processing resources. Minis and mainframes purchased with expansion in mind may be stranded with unused capacity if departmental users opt for local network systems instead of feeding the work to MIS.

But local networks represent more opportunity than threat. Although local network solutions will not be as readily apparent to present business needs as standard mini and mainframe options, exploration of the technology can pay high dividends. ■

**Banyan from page 17**

have terminals connected, as well as PCs.

The applications developers are the individuals who are going to have to live with the dilemma of the minicomputer, because if they want to build an application, they're going to have to worry about dumb terminals over here and PCs over there. We think that's going to be a difficult thing for applications developers to deal with.

**What role will Intel's 80386 chip play in future server technology?**

I think the 80386 is being designed into systems along the same lines

that the 80286 was. The first products to come out will be desktop computers, the next generation of the IBM PC AT-type product concept. Right on the heels of that will be a range of minicomputers. Some of those 80386-based minicomputers will also make good servers. We will probably proceed with designing our own server with the 80386.

**What will IBM's LU 6.2 provide local net users?**

LU 6.2 would provide a cleaner, more high-performance interface between servers and mainframes. It's better than using 3270 emulation. However, there's nothing driving LU 6.2 today, but there are a lot of things using 3270 protocol conversion. And because of the nature of the protocol, it takes a lot of overhead to deal with LU 6.2. It's not a transport service as much as it's a character type of protocol.

**What types of capabilities can users ultimately expect from servers?**

I think we're very close to being able to do al-

most everything in a PC/server network environment that you can do with a minicomputer. And we're moving very rapidly to a point where the PC networking system is as complete, robust, reliable and manageable as a mini.

**What type of new local net services do you anticipate will be****coming in the near future?**

I think they fall into four categories. First is the management aspect of things. There are some significant tools today for administration, network management and so on, and I think they're going to be significantly broadened over time.

The second category is data base services. There are going to be a number of network data base enhancements made — PC data bases redesigned to work in network environments, Unix data bases being migrated over to a PC networking environment and networking capabilities being integrated into the operating system itself.

A third area is applications. Tools — such as compilers, debuggers and testing facilities — will be added to build applications and test them to ensure they work in a network environment.

And then you might have tracing in addition to that, which is a part of debugging, so that you can actually build an application, test it, get it implemented and then be able to continually enhance and revise the application in a very complex environment. Networks are not an easy environment to develop applications for.

The fourth and last service is potentially very interesting and one I think we are probably going to evolve to — that is, offering a compute service. There are many high-performance minicomputer systems, [DEC] VAXes for example, that are usually task-oriented. If you're a PC or a departmental network that knows how to locate that computer as a service to which you can pass off jobs or requests, then you can have that high-performance computer system as a component of the network.

The key is to do it at the service level, as opposed to using other discrete communications functions. I think that's where the majority of the emphasis will be.

**When will these capabilities become available?**

We've already seen some of the administrative and diagnostic capabilities being delivered. I think you'll see significant improvement in the quality and the breadth of those products immediately. I think early next year, you'll start to see some of the data bases and the tools evolving.

**Are the local net vendors going to be the primary thrust behind bringing these tools out?**

We have to be. We have tools already that allow you to build PC-based applications. The next wave of tools will allow you to build an application that is PC- and server-based.

**How long do you think it will be before the first of those personal computer- and server-based applications are available?**

I think by the end of next year you'll be able to build an application for a PC network nearly as easily as you could build one for a minicomputer. The applications tools that will come along will include the distributed aspect of the environment as a fundamental part of their offering. You'll be able to build a segmented application, and then the tools in a run-time network environment will allow those components to be in different nodes in the network without you having to know it.

**What changes do you foresee in MS-DOS? How will these changes affect the local net world?**

I think there's going to be a significant level of enhancement to MS-DOS. Basically, I think Microsoft, Inc. is going to be expanding DOS as a PC-based or workstation-based operating system, making sure it is more robust and more complete than Unix in that environment.

Microsoft wants to make sure that Unix is not chosen as an alternative on the workstation, that MS-DOS remains the standard. That's got to be their primary focus, to make sure they hold that position of a standard. And as they evolve MS-DOS and add more multitasking and more multiprogramming capabilities, they'll lose the compatibility with the current MS-DOS environment and have to add communications capabilities to it.

**What do you see as the most pressing network software issues right now, first from the vendor standpoint, then from the user point of view?**

From a vendor's perspective, a settling in the number of standards. It's important to support multiple standards, but it's difficult to support them well. I think everybody can benefit from a scaling down of the number of supported standards. And that applies to physical networks and everything else. There are just too many of them, and they

don't differentiate themselves well enough.

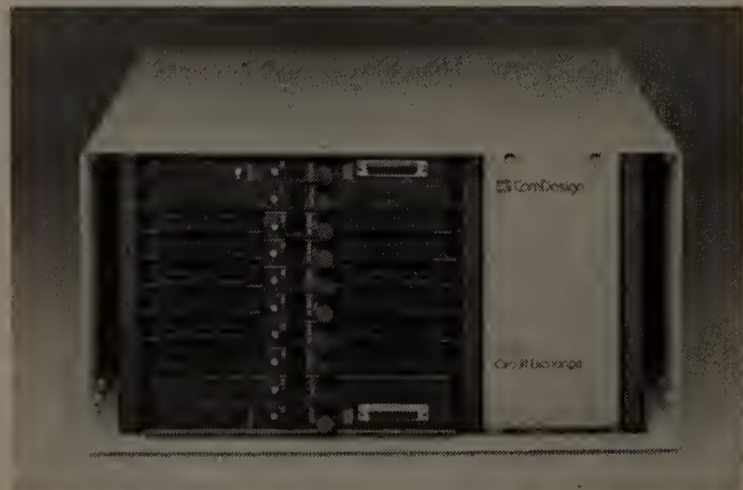
From an end user's point of view, I think first the availability of applications that were designed to work in a network environment — or have been redesigned to work in a network environment. And second, is the availability of these development tools. If the tools are going to make the availability of applications better, and the applications will be more reliable, I think it's very important that the tools become available soon and that they be complete. ■

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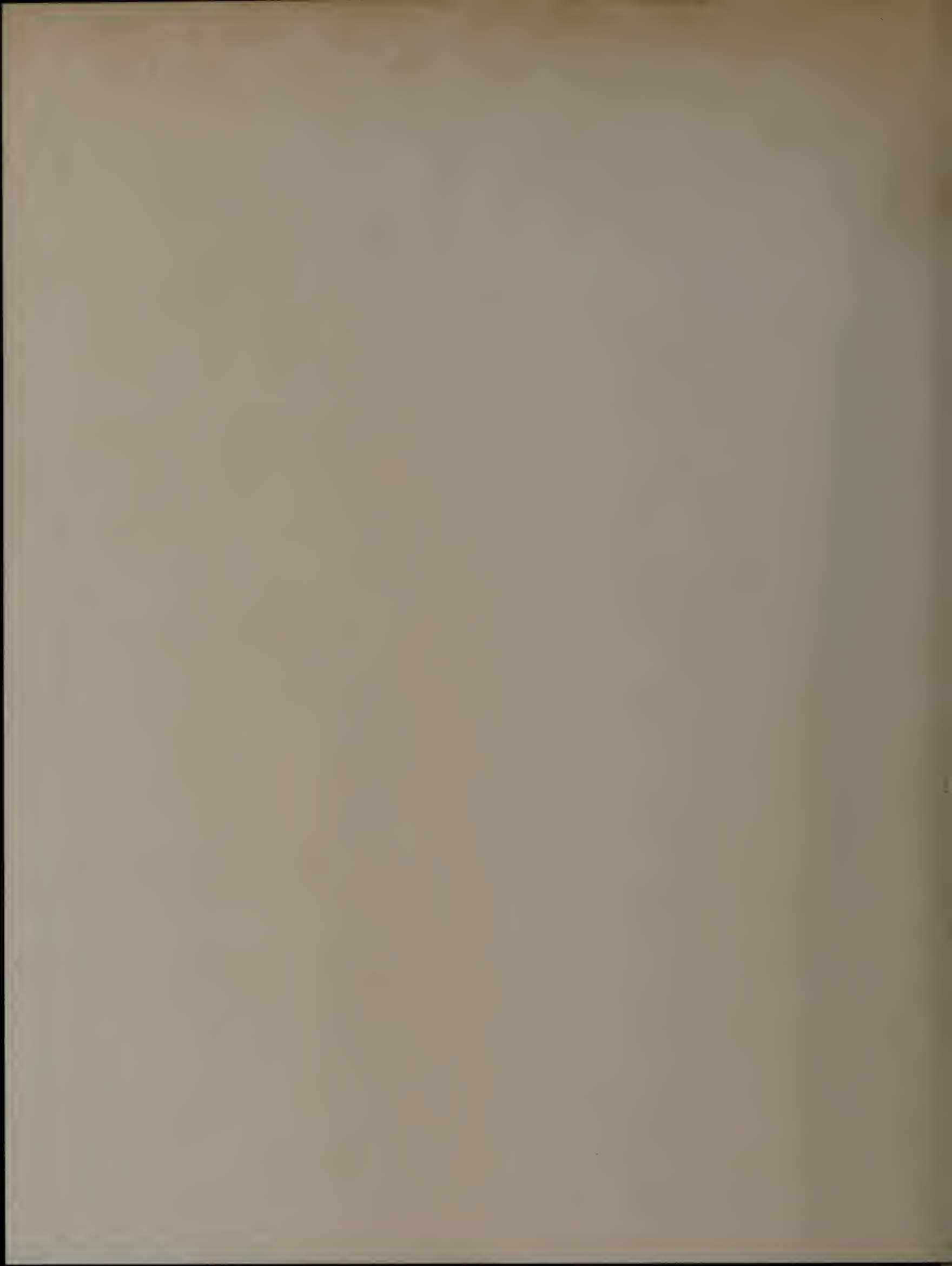
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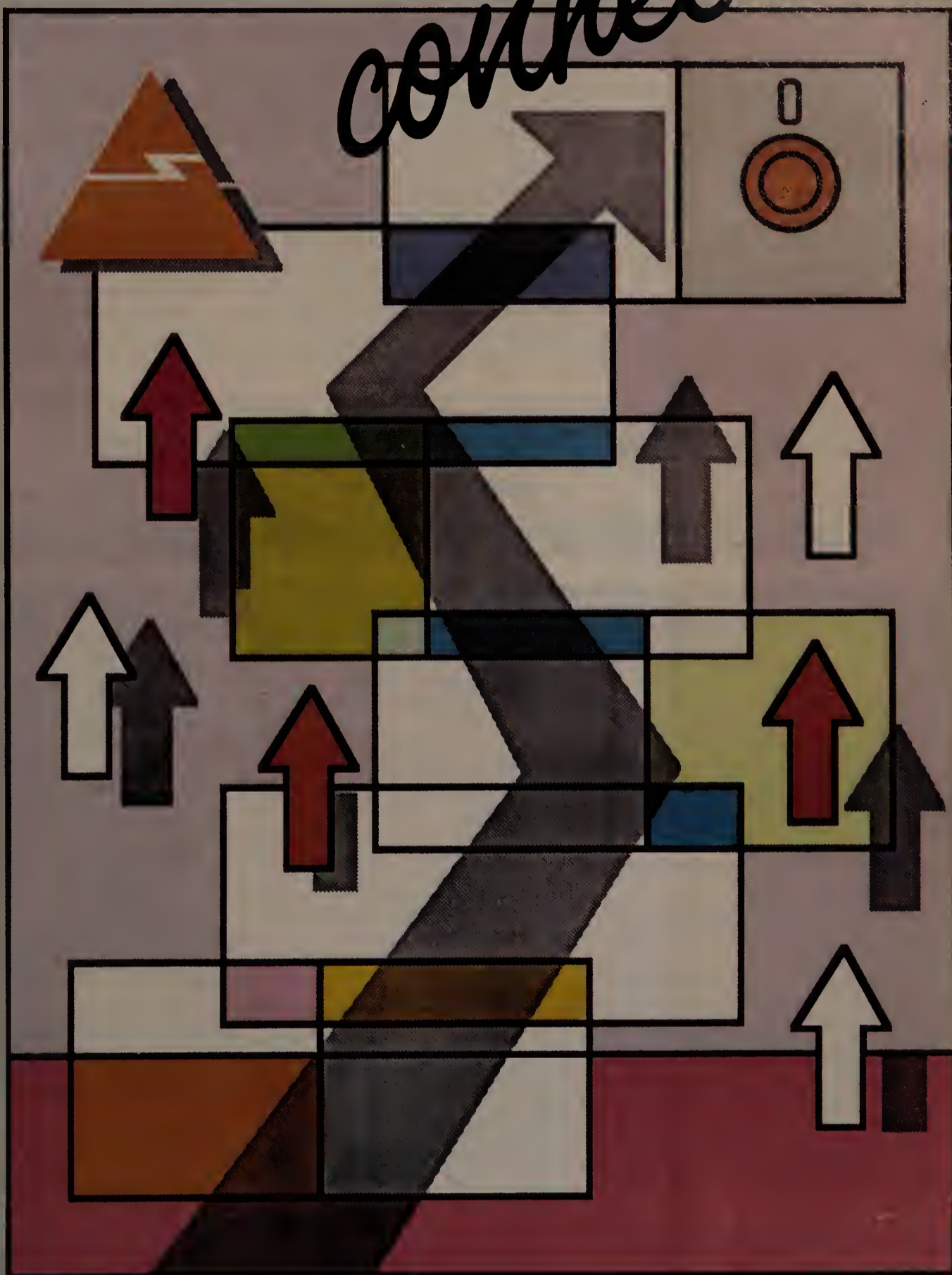
*connection*

Communications software is a super glue that can join systems, networks and applications of different types. But as communications managers know all too well, it's tough to identify the right glue to buy. This pullout section defines the market, explores the pros and cons of contracting for custom software and examines communications software applications in specific industries.

**19** Users in different industries are just waking up to the potential of customized communications software. By adapting packages to fit specialized needs, users are profiting through better links to suppliers and customers — but slow standards development is still a problem.

**23** There is no simple definition of communications software. Users surveyed for this International Data Corp. report insist that it must at least be able to establish a connection, format and reformat data, and transmit that data — all transparently. Micro links top the list of essential communications software tools.

**27** Managers who think they need custom-made communications software should have all the facts before contacting a developer. First, they should find out whether a suitable package already exists. If not, they must carefully work out a deal with vendors for a ground-up design.



ANTHONY SCHULTZ

## Scratching a niche

Fitting communications software in industry niches is like buying a tailored suit. A few stitches here and a tuck there, and it's a perfect fit. But when off-the-rack packages can't be modified, software must be custom-made using nascent industry standards as patterns.



The banking industry is among the leaders in communications software because computers and communications are integral to a bank's operation. Commu-

nications software is gaining importance as banks attempt to move their services closer to retail and commercial customers.

Home banking is one service that banks have used to woo retail customers. A few years ago, Chemical Bank & Trust Co. of New York made a substantial investment in Pronto, a home banking program of its own design. Customers were able to complete all of their banking transactions with a personal computer and a modem. Chemical Bank developed custom software so that various types

See Niche page 20

Niche from page 19  
of personal computers, such as IBM's Personal Computer and Apple Computer, Inc.'s Apple II could be used with this application.

Despite its advantages, home banking has not caught on. Chemical Bank now markets its home banking service as part of a large videotex offering.

Banks have successfully moved their services closer to retail customers with automated teller machines (ATM), and they are trying to tie their ATMs into regional and national networks.

Software to drive these networks has proven to be a lucrative business for some corporations. A few companies, such as A.O. Smith Data Systems, Inc. in Milwaukee,

have developed software and a network to drive the ATMs for a number of local banks. The program was so successful that the company began to offer ATM software and network services to banks throughout the U.S. Currently, approximately half a dozen companies compete with A.O. Smith.

Banks have also been working to link commercial customers closer to banking services. Visa USA and Mastercard International, Inc. both have international networks that link member banks and merchants. Both organizations, which are jointly owned by a number of banks, have communications software and hardware products that enable their users to access the network and route authorization in-

formation to the institution that issued the credit card.

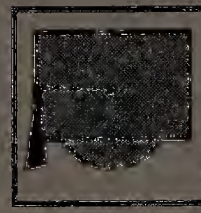
Citicorp established a leased-line link with communications software on both ends with one of its largest customers, Goldman, Sachs & Co. Roger M. Lynch, partner and chairman of Goldman Sachs Money Market, Inc. says, "The link saves time and labor, improves controls, reduces errors and enhances security."

Security tops the checklist for financial institutions. The U.S. Treasury mandated that by 1988, all government departments that use its payment or collection systems would have to adhere to a certified authentication standard.

This standard, called the Message Authorization Code, is an en-

ryption technique code based on the long-standing Data Encryption Standard, developed by the National Bureau of Standards (NBS). Jones Futurex, of Rancho Cordova, Calif., has announced an encryption package that meets this standard.

— Paul Korzeniowski  
Senior Editor



Unlike a business that uses a fixed set of applications to support its functions, a university needs a medley of teaching, research

and administrative applications. Because of their diversity, universities often cultivate a variety of networks and software and then seek connectivity between systems. "In a university, you're always going to have a multivendor environment," according to John Kingland, director of telecommunications for Iowa State University of Science and Technology in Ames.

Iowa State is one of several universities currently installing an AT&T Information Systems Network (ISN) and an AT&T System 85 integrated voice/data private branch exchange. The university's installation is unique because of the networking of three packet controllers in a wide-area net in a campus setting, Kingland says.

Although the university is using mostly off-the-shelf software, custom software has been written for a direct fiber interface between ISN and the university's Digital Equipment Corp. VAXs. The university is working on the same kind of direct

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Banks have moved their services closer to retail customers with ATMs, and they are trying to tie their ATMs into regional and national networks.

fiber gateway to its IBM equipment.

Much information in the academic world is wide open. "Access to everything is the name of the game," Iowa State's Kingland says.

But administrative data must remain secure, and Iowa State is using a software-dedicated private virtual circuit within the overall network to secure administrative data.

Several universities use the public domain Kermit software package as a lowest common denominator communications protocol because it's free and runs on a wide variety of hardware.

The up-and-coming protocol is Transmission Control Protocol/Internet Protocol (TCP/IP) because it is an internetworking protocol, according to Robert Roy, network manager in the Office for Information Technology at Harvard University in Cambridge, Mass.

On its campus network, The Massachusetts Institute of Technology in Cambridge supports TCP/IP and CHAOS, which is a more specific TCP/IP-level protocol developed in-house.

While "Ford probably doesn't tell GM a lot of things," says Stan Baer of the Harvard Business School, universities must be more flexible with their communications systems than other industries because of the need to communicate within the academic community.

— Nadine Wandzilak, Staff Writer.



Universities aren't the only ones plagued with integrating a variety of different standards.

The federal government also encounters that problem, says John Heafner, chief of the systems and network architec-

The up-and-coming protocol is Transmission Control Protocol/Internet Protocol because it is an internetworking protocol, according to Robert Roy.

ture division at the National Bureau of Standards.

"People are using a wide range of vendor-specific standards like IBM's SNA and DEC's VAX," Heafner says.

"There is also a lot of home-grown stuff, which is expensive. You have to pay development costs, and you have to maintain it."

A group called the U.S. Government OSI Users Committee will send out a procurement document to vendors on Dec. 17, outlining the government's specifications for future communications software based on the International Standards Organization's Open Systems Interconnect protocol.

Right now, the closest thing to a standard for communications software used by the federal government is TCP/IP. That protocol was defined by the Department of Defense in the early 1970s for use on its Advanced Research Project Agency Network (ARPANET) communications network.

"TCP/IP incorporates the Berkeley Unix 4.2, and it became very

popular in academic and scientific circles," says Bharat Thacker, a consultant with Universal Computer Applications of Southfield, Mich. "It was originally used in wide-area networks, but it became popular with the proliferation of local-area networks."

— Mike Fahey, Staff Writer



The health care industry is not immune to the problems of non-standardized communications software. Several

clinics and hospitals still stumble along in centralized environments without a standard language or protocol.

The path to standardization of languages, protocols and architectures has not been rose-strewn. As Joel Gochberg, software engineer at Burdick Corp. of Milton, Wis., says, "TCP/IP and X.25 are sort of favorite protocols, but the medical field follows what the rest of the industry is already doing."

The real progress seems to be in the area of unique applications, particularly with dial-up data bases, which, through communications software, automatically respond to inquiries from remote sites. The Food and Drug Administration maintains an up-to-the-minute data base of medical equipment and drug information, including recalls and resultant symptoms.

Medicomp of Virginia, Inc. devel-

oped a key-based medical record system that maintains patient data including symptomatology, laboratory data, drug history and dates of occurrence. According to Peter Gotra, president of Medicomp, with the use of artificial intelligence, the system can assist in patient diagnoses. The eventual goal is to standardize terms across the industry so that the system would hold all patients' records and could be accessed nationwide.

However, patient confidentiality demands that the nets have high marks in security. And the amount of incompatible equipment necessitates that the communications software be complex yet flexible.

In the future, hospitals will run  
See Niche page 22

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**Niche from page 21**

on a common data network that adheres to the Medical Information Bus (MIB) standard, Burdick's Gochberg says. That will allow all hardware around a patient's bed to communicate through a computer, thereby permitting centralized information retrieval and control. MIB, initially developed at Phoenix Baptist Hospital in Phoenix, Ariz., is now under debate in an IEEE standards committee.

— Pam Powers, Senior Editor



The engineering profession is also in on the stampede toward standardization with translator software called the Initial Graphics Exchange Specification (IGES). Bradford Smith, IGES project chairman for the NBS, says the intent of IGES is to establish a communications bridge between computer-aided design (CAD) systems produced by different vendors — without losing anything in the translation.

Smith explains that IGES software translates two-dimensional or three-dimensional part models from a proprietary graphics format on one CAD system to IGES format. Once in IGES format, the data can be transmitted across a communications network or some type of telecommunications link, to the re-

ceiving CAD system. The IGES software on the receiving system changes the data to the proprietary display format used by that system.

Smith admits that problems develop with IGES when the two CAD systems don't support the same part-modeling capabilities. For example, one CAD user cannot successfully transmit a two-dimensional part drawing to another CAD user whose system recognizes only three-dimensional displays. The key, Smith says, is to make certain the CAD users' systems support the same graphics capabilities.

David Saar, director of electronic engineering with the Hightstown, N.J.-based PA Technology, a diversified communications and engineering firm, says IGES, though functional, is a weak standard. "Although IGES is better than nothing and has been widely implemented by CAD system vendors, it does not support the free exchange of drawings among CAD stations in a mixed-vendor shop," he claims. IGES Version 1.0 is already an American National Standard.

Two major CAD/computer-aided manufacturing systems vendors that currently offer a variety of communications software offerings compatible with IGES are General Electric's Calma Co. in Milpitas, Calif., and Intergraph Corp. in Huntsville, Ala.

— Bob Wallace, Senior Editor



Communications software is the high-tech fuel that keeps cargo moving in the freight industry. "We look at com-

munications software in two different ways," says Henry Meetze, president of Railinc Corp. in Washington, D.C. "One is control of our national data communications network, and the second is communication with our network."

Railinc, a subsidiary of the Association of American Railroads, developed and marketed a software package called EDI/Synapse that allows end users, such as shippers and suppliers, to input and format network data. In addition, the freight company has recently introduced EDI/Finance, a software package that lets users transmit transportation or business-related documents in various formats, via Railinc, to the receiving carrier.

"Our philosophy was to take the data at the user's location and provide him with the software that would enable him to manipulate it," Meetze says.

Another freight company that developed its own communications software in-house is Consolidated Freightways, Inc. in Portland, Ore. In a joint effort with IBM, Consolidated Freightways created a CICS-based system of applications with electronic mail built in. IBM even-

tually took the package on the road and marketed it as Freight and Equipment Reporting for Surface Transportation (FERST).

Because the freight industry is unionized and labor rates are high, Consolidated Freightways included some special functions in FERST to keep the software efficient. "We have added our own terminal-enhanced function to provide local storage advantages in case of a leased-line or system failure so the operator can continue to enter data," says Richard Gutherless, manager of technical support for Consolidated Freightways.

According to Rob Golstein, manager of systems programming for Yellow Freight in Overland Park, Kan., there is nothing special in the freight industry in terms of communications software standards. "We don't have any neat kinds of communications protocols like the airlines do."

The adaptation of communications software to specialized industries reflects the flexibility, and perhaps the uncertainty, of the technology.

The general lack of standardization within the industries, however, will probably remain until users are able to focus on a common specification within their multi-vendor environments and vendors can support those standards. □

— Christine Casatelli  
Assistant Features Editor

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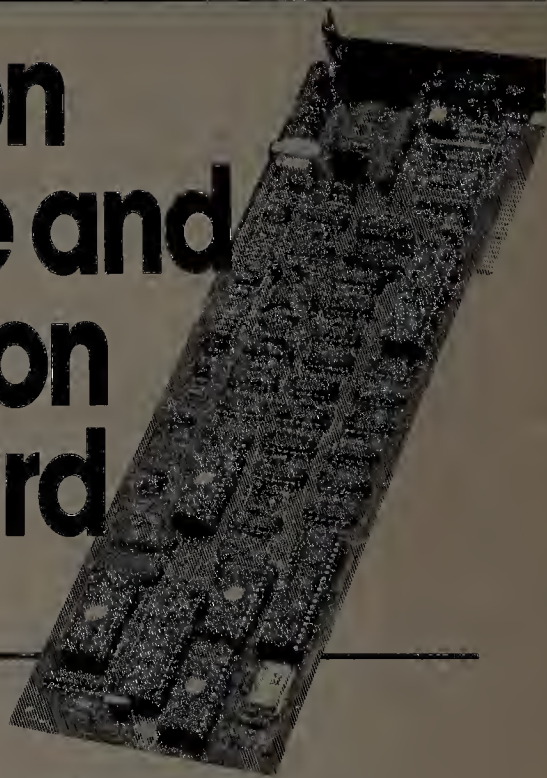
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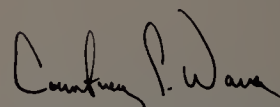
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## THE SOFTWARE

connection

# Software takes center stage

And the spotlight turns toward microcomputer links.

Continued from page 1

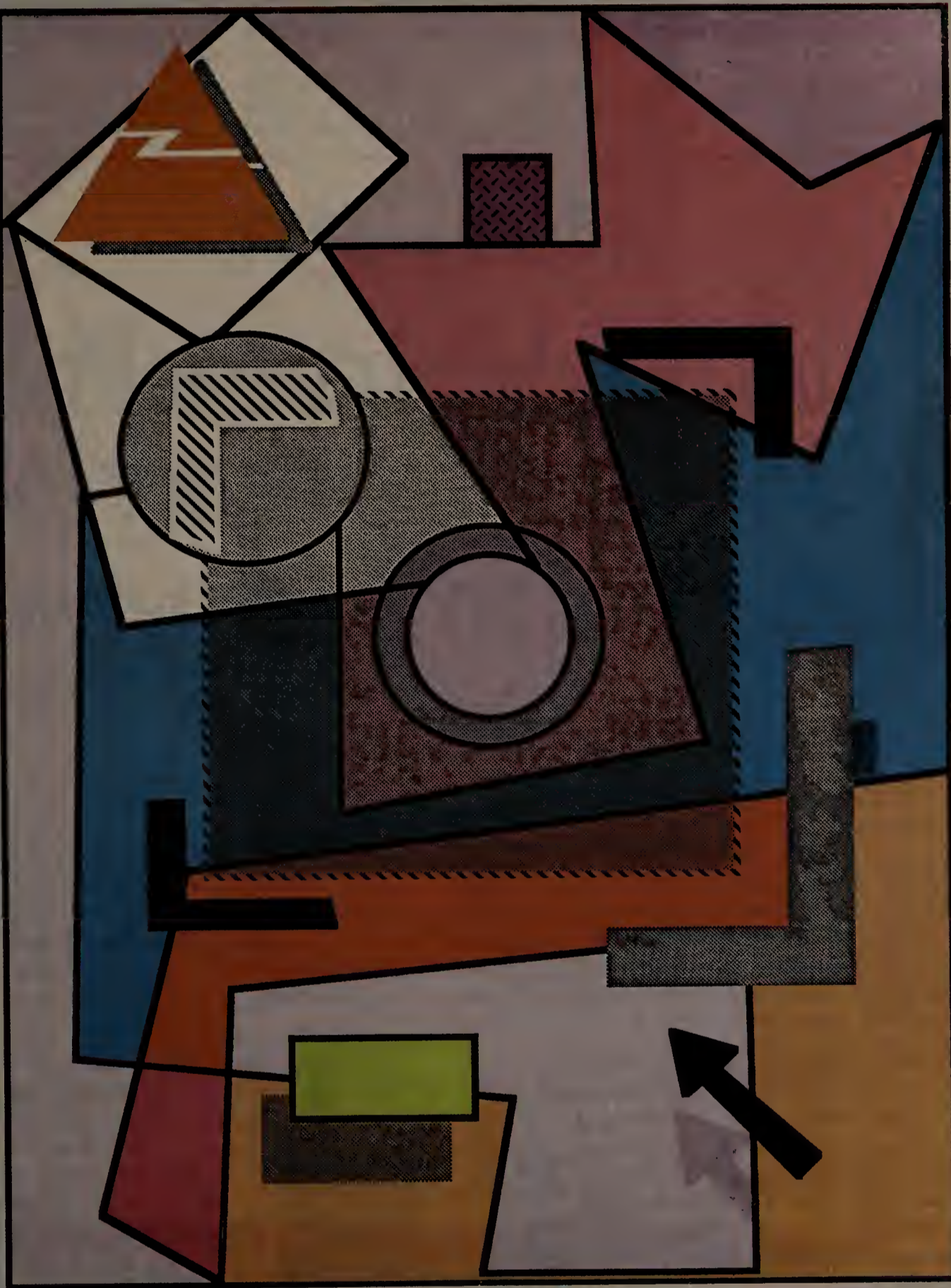
mainframes. The type of communications software that is needed often varies considerably depending on the mix of system manufacturers, system types and applications involved.

According to a survey conducted by International Data Corp., a market research firm in Framingham, Mass., communications managers generally say that communications software should be able to establish a connection; format data for transmission; transmit, receive and reformat the data; and terminate the connection. Above all else, it should manage this entire procedure transparently.

These same managers point to micro-to-micro and micro-to-mainframe communications software solutions as the most critical issues in software development. They maintain that mainframe communications software is an IBM problem, and minicomputer software is system- or application-defined. But micro communications, particularly the software that connects and integrates microcomputers into corporate information systems, is the primary area of concern among them.

User organizations are actively seeking ways of integrating personal computer resources into overall information systems architectures. Numerous communications hard-

*Gold is senior research consultant on local-area networks and communications software, Newman is managing editor of Communications Industry Report and Myhre is vice-president of communications and office automation for International Data Corp., a market research firm in Framingham, Mass.*



ANTHONY SCHULTZ

ware and software solutions have emerged over the past few years that respond to this growing customer requirement and resulting lucrative market opportunity.

Herein lies the problem. The heightened activity in the micro communications marketplace has generated considerable confusion on the part of users. Overlapping and often incomplete standards, limited product functionality and rapid technological change have made decision-making difficult, if not impossible.

Micro communications software can be classified into the following four broad product/technology areas:

- Asynchronous dial-up communications software packages for personal computer-to-personal computer and personal computer-to-mainframe applications.
- Integrated micro-to-mainframe packages where mainframe-based software works with some combination of hardware and software at the personal computer to accomplish file transfers.
- Protocol conversion or emulation hardware and software enhancements, particularly file server and gateway software.
- Local-area network operating systems and Open Systems Interconnect-based inter-



See Center stage page 24

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networking software.

Asynchronous communications software for personal computers allows the user to control the modem with the personal computer through simple commands. The user may move data among disk, random-access memory and the modem itself; assign memory space for incoming and outgoing data storage; and create macros for automated keyboard execution.

In general, one type of asynchronous software is used for data and file transfer and the other is used for terminal emulation. Terminal emulation is typically an add-on feature.

Issues of data integrity, error detection and error correction are the

fundamental problems in personal computer communications software development. The most popular error-checking protocol today is Xmodem, which has become a de facto standard for low-level personal computer-to-personal computer file transfer. Xmodem works well at 1,200 bit/sec, but not at 2,400 bit/sec or above.

Xmodem is a file-transfer protocol with no inherent interactive ability. The receiving micro doesn't acknowledge that a file has been sent, so the sender is unaware of any error in transmission.

The two popular protocols that are currently contending to usurp Xmodem's position are XPC, from value-added network provider Tymnet/McDonnell Douglas Net-

work Systems, Inc., and MNP, from modem manufacturer Microcom, Inc. The difference is that MNP is a hardware solution and XPC is a software solution, although both have been implemented in hardware and software offerings. Right now, there is no error-checking protocol standard.

#### Protocol conversion/emulation

Through the use of utility software, hardware expansion boards or both, a microcomputer may be made to look like a dumb terminal to interact with host systems.

There are three types of conversion that can be performed. The first is from ASCII to Binary Synchronous Communications (BSC) for use by an IBM system. The sec-

ond is from ASCII to an X.25 format and then to a BSC or Systems Network Architecture/Synchronous Data Link Control (SDLC) format. Its purpose is to move data from a micro to an IBM host via an X.25 network.

The third type of conversion is from an ASCII format to an SNA/SDLC environment and is used to move data from a personal computer to any IBM host running under SNA. These products have the ability to make ASCII terminals and personal computers function like an IBM 3270 terminal.

The adapter board with software package is the most prevalent solution for all three types of conversions, providing code conversion and terminal emulation at the personal computer level. Depending on the connection, the cost per board — excluding optional software packages and extended file transfer support — ranges from \$600 to \$1,200.

Gateway packages for local-area networks with typical configurations of one to 64 connections range in price from \$1,000 to \$10,000.

The stand-alone converter plus software approach bundles a stand-alone protocol converter with personal computer software. These converters require their own power supply and are not transparent, in that they have controls that must be manipulated separately. Their advantages are that they are not restricted to a certain personal computer bus and, therefore, can work with a variety of microcomputers.

#### Integrated software links

The majority of these protocol conversion/emulation products are personal computer-based. However, integrated software links generally have some host-resident software. These products move data from a mainframe software application into a micro software application like Lotus Development Corp.'s 1-2-3 or Ashton-Tate's Dbase III Plus. The software for these products resides in the mainframe and micro and frequently includes add-on hardware.

Mainframe-resident conversion/emulation software is sometimes used to handle the difficult process of fitting a file to the format of the microcomputer software. Mainframes also handle data selection, providing powerful data base query functions.

Mainframe software links determine how such a connection is established. Some of the less expensive packages work in conjunction with user-supplied adapter boards. However, most of these packages are expensive.

#### IBM's software strategy

What is IBM doing now, and what will it be doing in the future? How will that affect personal computer communications software trends?

The announcement of LU 6.2/Advanced Program-to-Program Communications (APPC) was a statement of direction for IBM in its development of SNA, allowing  
See Center stage page 25

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#### Center stage from page 24

different devices to share information in a peer-to-peer environment. Unfortunately for the user community, widespread implementation of this protocol is still several years away. Until application programs are written for this protocol, there won't be transparency between the applications and communications programs.

IBM announced a uniform architecture for micro-to-mainframe communications consisting of IBM's new Server-Requester Programming Interface (SRPI), which provides programmers with a standard format for developing micro-to-mainframe applications. Components for the IBM Personal Computer family and 3270 Personal Computer, called PC requesters, allow end users and applications to access mainframe data and servers.

SRPI and the announced applications that support it provide a uniform structure for micro-to-mainframe links but don't make life any easier for organizations that need to provide personal computer users with access to mainframe data. The announcements form the structure and the tools, but data center programmers still must write the applications that allow users to access specific files and records.

There are more than 200 micro-to-mainframe products on the market today. Users are overwhelmed by all the possible solutions, and there is so much product overlap that all offerings fade into one another. The trend will eventually be toward an environment where all applications software is written with communications functions as part of the program. Until that time, however, the user is left to wade through the flood of products.

#### LAN software

Local-area network software, while moving forward, is still an area in desperate need of attention by vendors. In the mid-sized terminal systems network environment, network operating systems and applications software standardization has been a free-for-all among systems manufacturers that all claim Open Systems Interconnect (OSI) compatibility while remaining largely vendor-specific and incompatible.

Most terminals or system local nets are standardized at lower OSI levels. They begin to look quite vendor-specific at higher levels. The most talked-about high-level and low-level network systems protocols include Xerox Corp.'s Xerox Network Systems, Digital Equipment Corp.'s DECnet and SNA.

The U.S. Department of Defense standardized Transmission Control Protocol/Internet Protocol (TCP/IP) as the required set of protocols for its network development because the government requested it for its contracts. Systems manufacturers that count on Defense Department dollars have moved to offer TCP/IP support for the short term, although the federal government has stated that it will move to OSI implementation in the early 1990s.

It does not appear likely that a universal, upper level protocol standard for terminals or system local nets will emerge any time soon. Most recent developments have been in the area of providing gateways through protocol emulation across vendor environments. Most of this emulation has been directed toward IBM compatibility.

The problem of network operating systems standards has also plagued the personal computer network environment. Up until the introduction of Microsoft Corp.'s MS-DOS 3.1 and IBM's PC Network protocols, the local net market was distinctly lacking in standards for upper level protocols.

Thus, if a software vendor wanted to write network applications, it

would have to decide which networks to support and write specifically to those protocols.

The entrance of IBM and Microsoft into the local network market has brought some stability and compatibility to network protocols. MS-DOS 3.1 has emerged as a de facto microcomputer network standard at the presentation level. In addition to IBM, products such as Novell, Inc.'s Netware and Microsoft's MS-NET support DOS 3.1. However, the issue of standards and compatibility is not as clear as support for DOS 3.1.

Because parts of MS-NET were deemed inadequate by IBM, it implemented different upper level, application layer protocols than Microsoft. Thus, IBM's PC Network

program supports different functions and has a different user interface than MS-NET file server utilities. One result of this is that MS-NET requires a dedicated server while IBM's PC Network does not.

Different protocols abound at the transport and network layers. IBM has implemented protocols called the IBM Network Basic I/O System (NETBIOS) that will be used in other IBM networks, including the Token-Ring.

This is important because many software developers will write to IBM's NETBIOS to improve the function and performance of their network applications. However, any applications written to NET-

See Center stage page 26

## Terminal emulation software with LAN support

# 5 reasons to make this LAN-to-mini connection

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increases while aggravation decreases on those lengthy file transfers.

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## 5. REFLECTION offers a powerful command language.

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**Center stage from page 25**  
BIOS would be incompatible with networks not supporting it.

Right now, no non-IBM network supports NETBIOS, though many vendors, including Orchid Technology, Inc., Novell and 3Com Corp., have indicated that they will support it in late 1986 to early 1987.

Many major local-area network vendors including IBM, Hewlett-Packard Co. and AT&T have announced support for MS-DOS 3.1. However, two different levels of application compatibility are still at issue. Most single-user applications such as Lotus 1-2-3 are "network-ignorant." That means they have not been written for a network environment, and they may present compatibility problems

when run on a local network.

With a stand-alone package, neither the user nor the application is able to make calls to the network. Use of single-user packages in network environments may pose serious security problems, such as the inability to protect files and the absence of file- or record-locking.

Many copy-protected programs can't be run off a hard disk file server. In addition, some popular applications can't run with the IBM PC Network because they make calls beyond DOS and are incompatible with NETBIOS.

A second level of compatibility is in programs written to DOS 3.1. These applications are network-aware in that they can direct calls to DOS 3.1 and can support DOS

3.1's default record-locking. DOS 3.1-compatible applications do have limitations because they don't support record-locking and because they may not support all network features.

Network-specific software is designed to take advantage of all network features including file- and record-locking, file transfer and access to remote peripherals. In addition, software vendors may be able to improve application performance by writing specifically to lower level network protocols. Many small software houses have adapted their applications for one or more networks, and several vendors specialize in developing local network applications.

Software houses with the largest

market share have yet to introduce multiuser network versions of their application software packages. Ashton-Tate is notable for producing a network version of Dbase II that failed to work well in a network environment.

There are strong indications that the reluctance of independent software vendors to develop network applications is as much a marketing question as a technical one.

Three issues confront independents. The first is demand. Although micro network installations have been growing at a brisk pace, the number of personal computers in network configurations still remains small, especially compared with the millions of IBM Personal Computers and compatibles that now exist.

The second issue is which network should be supported. IBM's PC Network represents a standard to which developers may write, but few have been installed. Other networks have larger installed bases, but they may not support DOS 3.1 and certainly don't support NETBIOS yet. Although NETBIOS is generally personal computer-to-personal computer, APPC/PC is IBM's way of allowing the network to communicate with the SNA environment at a lower level.

The third issue is that of single-user vs. multiuser pricing and network/site licensing. Software vendors have not decided how to price their products in a network environment. Some vendors charge a single fee for a network license, while others set the price by the number of users accessing that software on the network. Issues of network enforcement remain to be resolved before major independents market software.

The cloud surrounding the software vendors is lifting. Many major players have realized that the network software market is a major market opportunity.

The trend seems to support DOS 3.1 first and network-specific versions later. The bottom line for network users is that there is some good network software now, with more to come from large software houses. However, it will be 1987 or perhaps 1988 before a large base of network software is available for popular networks.

In addition, file transfer systems; teleprocessing monitors; terminal support programs; network management, control and performance monitoring systems; I/O schedulers; data line control programs; and telephone management systems are all undergoing an evolution in cost, function and performance.

Although communications software is, for the most part, indefinable, it is the backbone of effective use of communications technology. Communications systems suppliers recognize how critical communications software is to the network, and they have invested huge amounts of money in software development. With vendors' ongoing commitment to communications software development, users will see continued improvement in performance and functionality. **Z**

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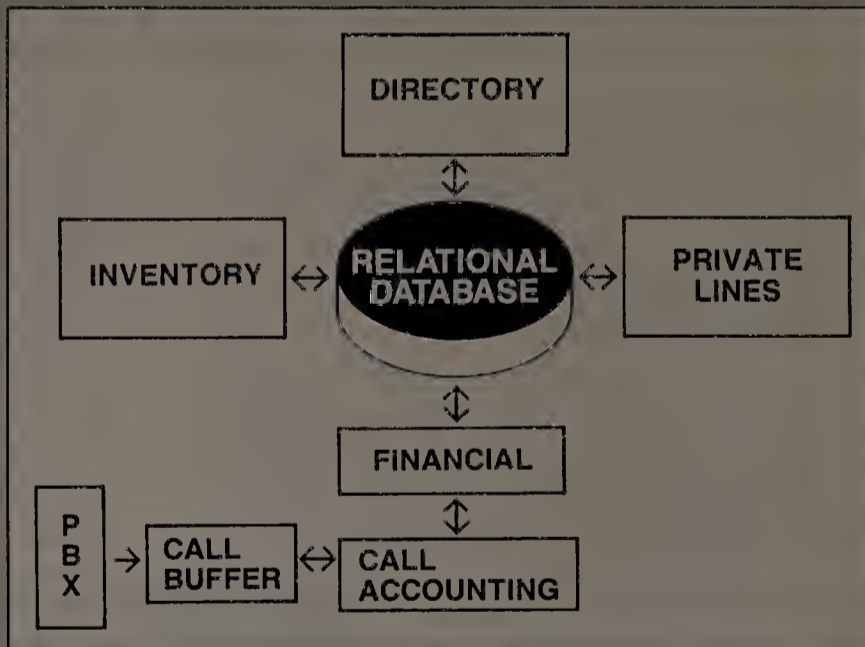
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# Playing for high stakes

The high cost of custom development leaves no margin for error.

**BY JOHN J. HUNTER**  
Contributing Writer

Do you have a special communications problem that you think can only be solved with custom communications software? If so, there are a few things you should know about custom software development before you pick up the phone.

If there is any market where the old chestnut "caveat emptor" applies, it is custom communications software. Making the wrong vendor connection can cost the network manager far more than the tens of thousands of dollars wasted on poorly conceived or designed systems — it can cripple the entire corporate communications network.

What's worse, the software vendor may be in an excellent position to place the blame solely on the communications manager. There are ways, however, for a manager to protect himself.

The list in the comparison chart on page 31 includes consultants and vendors that provide custom communications software either from a ground-up design or by modifying their existing packages. Many also offer products or specialize in certain areas of software development, such as file transfer software (which allows the transmission of files between incompatible systems) and network interface software (which provides an interface between systems).

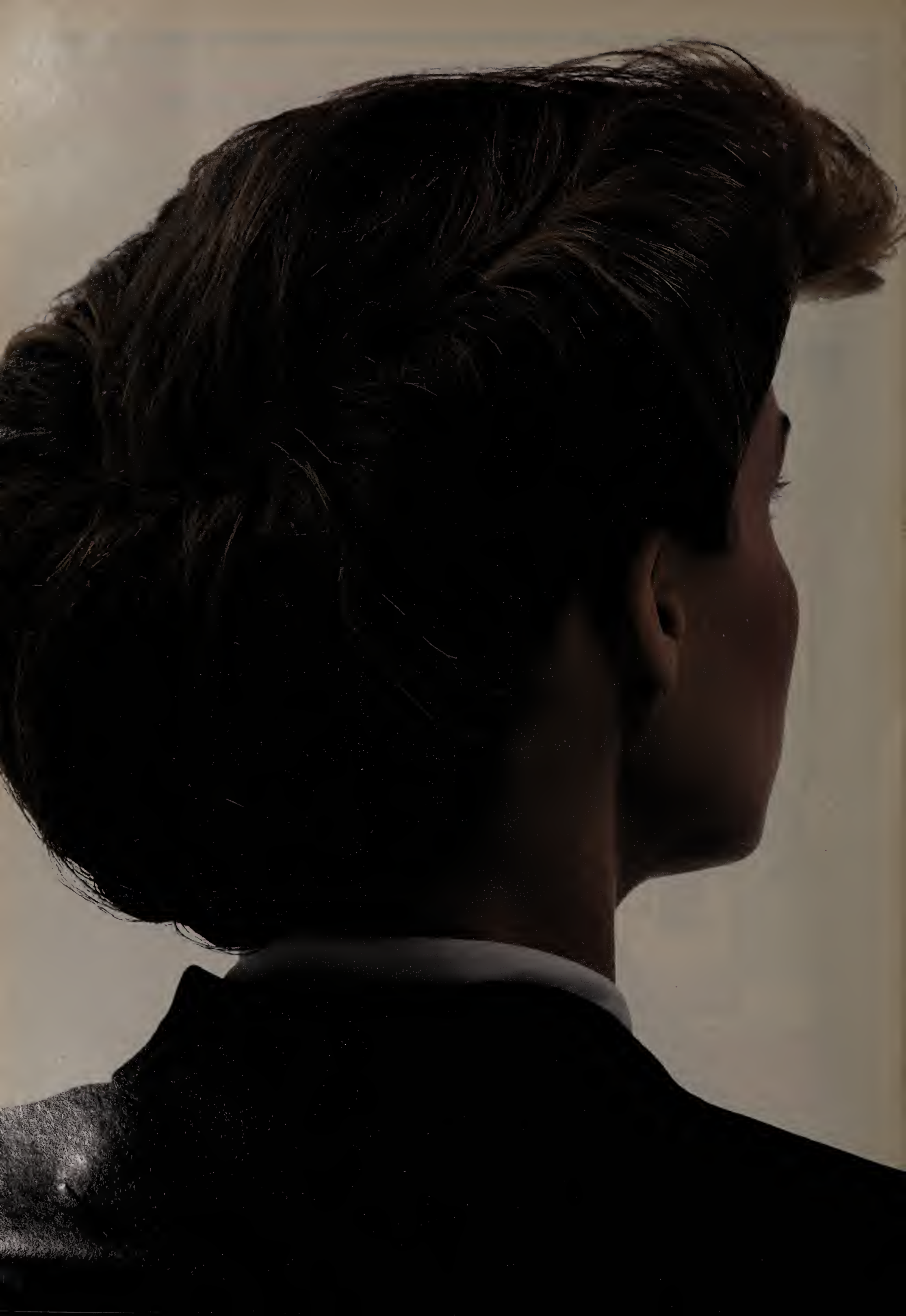
The companies listed represent a sampling of the hundreds of custom software houses

 See **Cost** page 30

*Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.*

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Cost from page 27

currently in the market. Every major computer, communications, and local-area network vendor offers software and firmware that can be modified to some degree to fit the customer's needs. Those companies, however, are omitted from this article since custom communications software is not their main business.

#### Reinventing the wheel

Through the 1960s and early 1970s, much applications software was written by in-house programming staffs. Companies continuously reinvented the wheel by writing their own payroll, accounts payable/receivable, general ledger and other programs.

However, systems software, which includes such things as communications monitors, data base management, systems simulators and operating system enhancements, usually required more ex-

pertise. This gave rise to the custom systems software industry, which includes communications software.

By the end of the 1960s, the market for "packaged," or "canned,"

software began emerging. Packaged software comprised specific applications and systems software that users could purchase and install at a fraction of the cost of a custom-designed system.

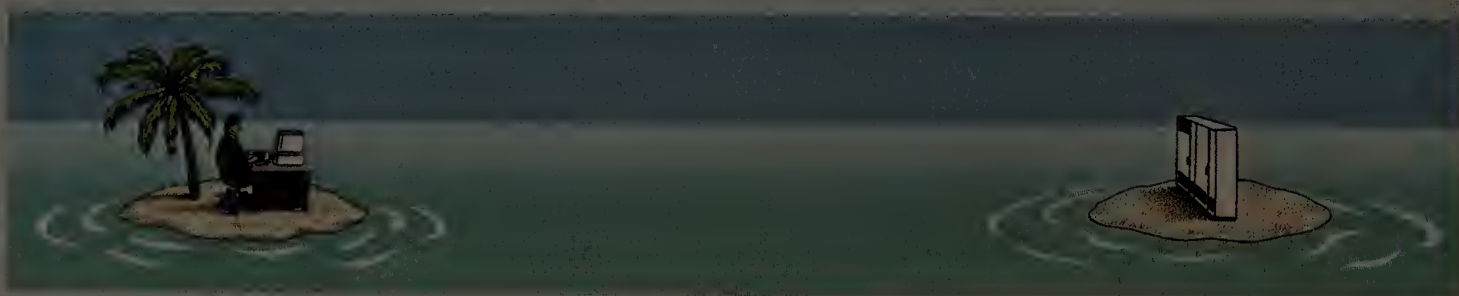
But many of the early canned software packages turned out to be fool's gold. The gold went to the seller who recovered development costs for a package designed for a specific application. The fools were the buyers who found that the package could not be readily modified to meet their applications.

In addition, some packages were offered with no warranty, no updates and no maintenance. And to make matters worse, many packages came only in unalterable object code form, as opposed to modifiable source code. If the vendor went out of business or stopped supporting the package — which was not unusual in those days — the buyer was left holding the bag.

In the early 1970s, a number of software design houses introduced products that could be easily altered to meet specific applications. While many of these systems were written to solve a particular problem, the structure of the program resolved around a kernel, or nucleus, which contained core functions common to the general application. Customizing the package to fill a

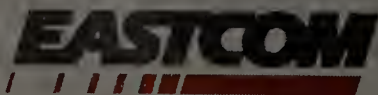
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. . .The fools were the buyers who found the package could not be modified to meet their applications. Some were offered with no warranty, updates or maintenance.

specific application need was, and still is, handled by software modules that interface with the kernel.

#### The modular approach

Today, custom communications software services vary from consultants advising clients on communications network design to software houses that design, implement and maintain complete hardware and software systems. In the middle are software houses that have developed a package or group of modules that can be reconfigured for an individual client.

"The current trend is to develop standard, portable software packages than can be easily modified," states industry observer Howard Gordon, founder of Network Research Corp., in Oxnard, Calif. "There is no leverage in custom-

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**Cost from page 30**  
software development, and maintenance costs would be excessive for individual custom packages.”  
Does this mean that software companies will not develop custom

systems? “Not at all,” says Gordon, “but the costs could be staggering unless the customer works out a deal. A good number of companies will not undertake a custom job unless the end product fits into their

existing product line.”  
Ralph Wondra, vice-president of independent design firm Raven Technologies, agrees. “Most hardware and software vendors will negotiate some sort of compensation, provided the end product can be resold. Many will even underwrite the development costs if they see a market for the end product. If not, they probably won’t bother with you directly but may recommend an independent consultant who will undertake the job.”

Typical vendor estimates for small, medium and large networks are shown in the table. A small system consists of four to 15 users at a single location; a medium system involves 20 to 50 users at two or three locations; and a large system involves more than 50 users at multiple locations. The time estimates assume that the vendor is familiar with the problem area and possible solutions. If vendor time or cost estimates show a large deviation from these figures, the user should ask why.

Typical project costs and schedules

Project size	Costs	
	Low	High
Small system	\$20,000	\$70,000
Mid-size system	\$50,000	\$90,000
Large system	\$250,000	\$3,000,000
Project phase	Schedules	
	Shortest	Longest
Evaluation	Seven days	Six months
System design	Three weeks	Eight months
Implementation	Seven days	18 months

SOURCE: TMS CORP., DEVON, PA.

Custom software vendors

Company name	Services offered			
	Custom-designed software only	Custom and packaged software	File transfer of software	Network interface software
Applicon, Inc. Ann Arbor, Mich.	X			
Battelle Software Products Columbus, Ohio		X		
BBN Communications Corp. Cambridge, Mass.		X		X
Boeing Computer Services Co. Vienna, Va.	X			
Communications Research Group Baton Rouge, La.		X	X	
Communications Solutions, Inc. San Jose, Calif.		X	X	X
CMS Group, Inc. Torrance, Calif.	X			
Data Architects, Inc. Waltham, Mass.	X			
Digitech Industries, Inc. Ridgefield, Conn.		X		X
D.L. Buck, Inc. San Jose, Calif.	X			
FlexLINK International Corp. Renton, Wash.		X		X
Gateway Communications, Inc. Irvine, Calif.		X	X	X
JMI Software Consultants, Inc. Spring House, Pa.	X			
LaBelle & LaBelle, Inc. Seattle		X		X
Make Systems, Inc. Palo Alto, Calif.		X		X
MicroServ Corp. Needham, Mass.		X		X
Network Solutions, Inc. Vienna, Va.		X	X	X
OnLine Software Princeton, N.J.		X		
Peregrine Systems, Inc. Irvine, Calif.		X		
Products Diversified, Inc. Houston		X		X
Protocol Team, Inc. Newport Beach, Calif.		X	X	X
Raven Technologies, Inc. San Jose, Calif.	X			
Teknekron, Inc. Berkeley, Calif.	X			
Telematics International, Inc. Ft. Lauderdale, Fla.		X		X
Virtual Microsystems, Inc. Berkeley, Calif.		X	X	X
Wall Data, Inc. Redmond, Wash.		X		X
Wollongong Group, Inc. Palo Alto, Calif.		X	X	X

SOURCE: TMS CORP., DEVON, PA.

Will an independent consultant work out a special deal? “Only if they know that the experience gained can be resold,” says Wondra. “As for compensation, the customer could work out some sort of royalty arrangement or whatever he deems beneficial.”

**Design process**  
For those planning to contract for custom communications software, here’s what to expect. The design process is carried out in four phases: evaluation, system design, implementation and installation, and maintenance. The customer must be heavily involved in the first two phases and may be involved in or completely responsible for Phases 3 and 4.  
The time and cost estimates for each phase will vary with the complexity of the project and the amount of new software that must be written.

Most vendors will negotiate some sort of compensation, provided the end product can be resold. Many will even underwrite the development costs if they see a market for the product.

software package or modules already developed, by developing new hardware or software or by a combination of both approaches.  
The evaluation phase can produce widely varying project plans, depending on the nature of the system considered. For example, a simple telephone system requiring a private branch exchange or telephone management system will place heavy emphasis on system  
See Cost page 33

**Evaluation phase**  
Many vendors undertake the evaluation phase on a time and materials basis, and a large portion of the charges are attributed to time. During this phase, the vendor relies on the customer to spell out the requirements and constraints of the system design.  
It’s the vendor’s responsibility to ensure goals are met by customizing a

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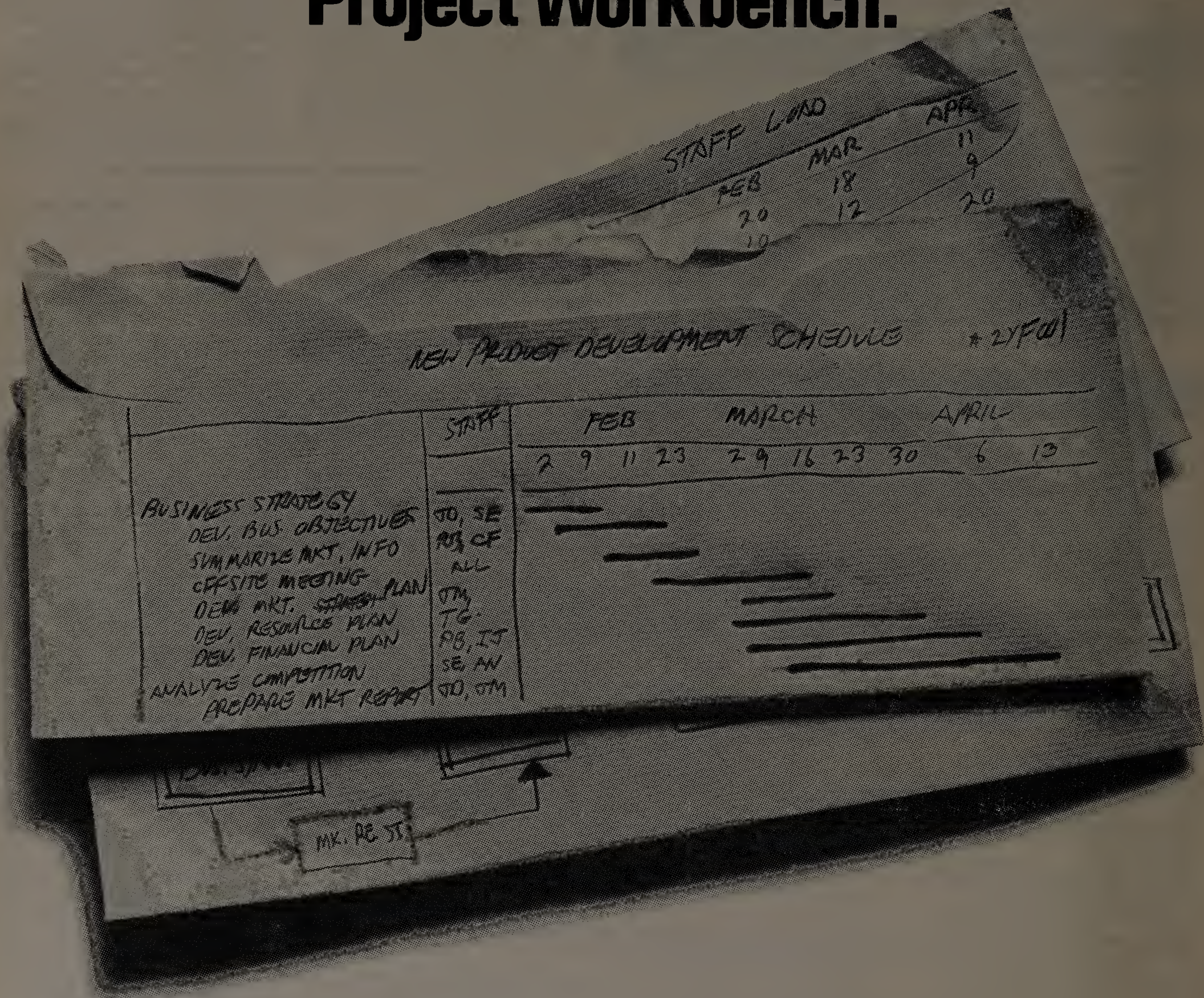
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**Cost from page 31**

economics, installation schedules and personnel training. Little time is needed for system design, since the procedures and the software packages needed are well known.

At the other extreme is a ground-up distributed data system, which includes applications and hardware development. Here, a considerable amount of time and money must be spent on component design and system integration techniques.

At the end of the evaluation phase, the customer should receive a proposal for the design and implementation phases. In the proposal the vendor should define the problem and describe the methodology for its solution. Milestones are often provided showing task completion phases and dates, and payment schedules are also usually included. Users should read the proposal carefully, paying

particular attention to the problem definition and solution sections. Any changes made after the proposal is accepted can be costly.

The proposal also protects the software vendor from customers who change their minds during the project or who demand additional features that the design cannot easily support.

The proposal should

Milestones are often provided showing task completion phases and dates, and payment schedules are usually included.

state who is responsible for determining the cause of problems that occur within the system, and should indicate who will interact

with the hardware vendor and communications carrier during the project's pre- and postimplementation phases. It is also a good idea

to discuss the proposed system with the hardware vendors and carriers to ensure overall compatibility. See **Cost** page 34

The vendor's proposal should define the problem and describe the methodology for its solution.

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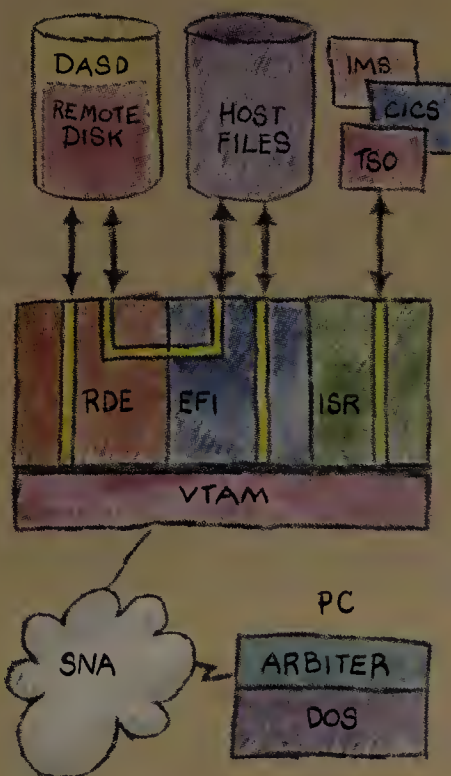
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**Cost from page 33**

These people should be privy to any projected changes that could adversely affect the new network

components.

**System Design**

The system design phase is primarily the responsibility

of the vendor, although customers can participate, especially if the implementation and maintenance phases are to be partially or

completely undertaken by the customer.

In this phase, the network, equipment, software modules, implementation techniques and implementation schedules are defined.

It is unlikely that new hardware (in the form of specially designed printed circuit boards) will be required, but if it is, the cost will be prohibitive unless

several thousand units are required. If the vendor is talking about specially designed boards, the user should talk to someone else.

Most vendors design their software to run as a user program under the computer manufacturer's operating system. However, it is smart to verify that operating system modifications are not taking place, since they could void any warranty or maintenance contracts with the hardware vendor. Even worse, should operating system problems occur after the new software has been incorporated, the responsibility

The system design phase is primarily the responsibility of the vendor, although customers can participate. . .

## From the sun-drenched banks of the Nile to the far reaches of space...



...especially if the implementation and maintenance phases are to be partially undertaken by the customer.

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Contel Federal Systems handles exceptional data and telecommunications challenges for clients all over the globe, and beyond.

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In the Middle East, Contel is overhauling communications

systems in Egypt, designing and installing security systems at the King Abdulaziz Airport in Saudi Arabia, and modernizing communications for the Army of Turkey.

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ity for repair costs could fall on the customer.

The custom software vendor undertakes the system design phase for a fixed fee or on a time and materials basis, depending on the project and the customer's requirements. If the vendor is familiar with the problem, a fixed fee is usually quoted. Most customers prefer a fixed fee, since it allows them to budget accurately for the project.

If the customer chooses to implement the system, customer personnel should be heavily involved in the system design phase. Most

See **Cost** page 35

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☐ YES, please send me a complimentary copy of "T1 Concepts and Applications."

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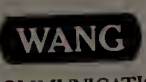
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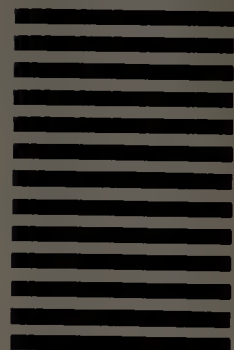
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#### Cost from page 34

vendors view such involvement as a technology transfer to the customer's in-house systems group. This is particularly true for user companies that intend to use the resulting software to serve their own customers, since they will be responsible for all maintenance and problem solving.

Upon the completion of the system design, the customer should review every detail to ensure that all requirements have been met. It can cost plenty to call the vendor back if the communications manager has signed off the design.

#### Implementation

System implementation and installation can be done either by the vendor or the customer; arrangements where both parties are equally involved are unusual. If the vendor handles the job, then the customer generally acts only as a tester of system components as they become available. If multiple vendors are involved, the customer may act as project manager.

The implementation phase can be time-consuming and costly, depending on whether existing standard software and hardware components can be employed. Completely new hardware or software can quickly run up costs. This is where an experienced vendor can save the customer money, since it will know which available software packages can be modified to meet design requirements.

Upon the completion of the design, the customer should review every detail to ensure requirements have been met.

If the user undertakes the implementation, in-house technical staff members must be assigned early in the project to work with the vendor during the system design phase to thoroughly learn the system. However, the vendor may charge extra for the training, and the productivity of the trainees is lost to the company while they are learning the system.

If the customer is to take full responsibility for the system after its installation, he must invest in training. However, the vendor should handle the implementation and installation. All too frequently, system bugs pop up during installation, and it is easier and quicker to have the vendor fix them.

#### Maintenance

All custom communications software is guaranteed for a defined period, beyond which the customer can elect to take a maintenance

contract.

For most users, an initial maintenance contract is desirable to ensure that the vendor will fix bugs not caught during the implementation process.

The extent of the maintenance service varies by vendor and by contract. All vendors offer telephone hotlines, and the larger com-

panies will even send a representative to the customer location if telephone diagnoses do not remedy the problem.

The cost of maintenance is a negotiable item for most custom systems. However, for software packages, the usual price of an annual contract is about 10% of the purchase price.

Shopping by price is not the way to buy custom communications software; vendor experience is everything. The communications manager should pick a vendor that can document a similar problem-solving experience, and he should ask for references.

The manager should also have his systems people call and ask to talk to their counterparts at the reference site. They should ask detailed questions about how well the system is meeting their needs. It's amazing how much comes out during a frank technical exchange. Finally, the user should find out how responsive the vendor has been to past problems. If the manager has any doubts about the vendor, he should call someone else. **□**

Shopping by price is not the way to buy custom communications software; vendor experience is everything.

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## Introducing automatic protocol conversion.

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In addition to Public Data Network, the Bell Atlantic Network Services Group provides an array of customized services to precisely match your communications needs.

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# Ride the wave

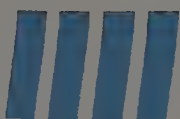
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Q—"How do I plan for new technologies and implement them into my company?"

A—"To help solve this problem CN '87 offers a full range of tutorials, seminars and discussions with most of the leading industry representatives who will discuss workable solutions to the pervasive implementation dilemma. To meet this need, there are a number of tutorials and seminars that deal with both tactical and strategic planning as well as user case studies that reveal the best approaches to implementing the new technologies."

Gerald P. Ryan, President  
Connections  
Telecommunications Inc.

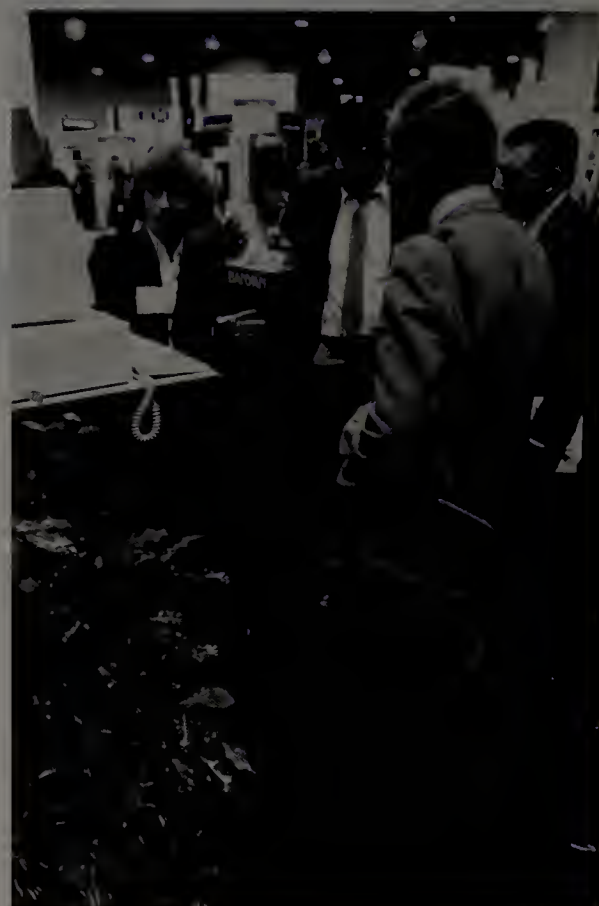


## Four days that will dramatically impact the way you do business

Over 1,000 must-see exhibits, 300-plus vendors and more than 17,000 of your friends and colleagues expected to attend makes CN '87 *the* communications event of the coming year!

CN '87 is four days of discovery—displays of voice, data and telecommunications equipment, services and software—the newest innovations and leading-edge technologies developed in our fast-changing industry. For 1987, CN delivers everything that has made it the *elite* expo and more—many more new product introductions and three huge halls full of exhibits in the bright, beautiful Washington Convention Center.

Plus CN '87 offers you a series of "In-depth" tutorials and a conference program unlike any other providing you with hard facts, how-tos, product solutions and important perspectives on such vital issues as regulation. At CN '87—under one roof—you attend the expo *and* learn in depth from industry experts about topics that directly influence your career, your organization ... your present and your future.



# Who should attend

If your title or job function appears here, be sure you attend *the* premiere telecommunications show—

- Top management with goal of improving telecommunications, network capabilities
- Corporate Communications, Telecommunications, Networks Manager, Director
- Communications Planning Manager
- Communications Systems Manager, Designer
- Communications Analyst, Specialist, Programmer
- Communications Coordinator, Operator, Technician
- DP/Software Manager, Analyst, Programmer
- Systems Engineer, System Engineering Manager
- Office Systems Manager, Analyst
- Product Development, Business Planning Manager
- Scientist, Engineer, Engineering Manager
- Operations, Maintenance, Installation Supervisor, Manager
- Sales, Marketing Executive, Manager





# You, Yes, You

will return to your organization with more invaluable information from CN '87 than from any other single source

Three spacious exhibit halls—over 378,000 square feet—filled with voice, data and telecommunications equipment, services and software products await your arrival at Communication Networks '87.

You will learn how vendors have addressed major areas in telecommunications. From network management, long-distance carrier services, fiber optics, teleconferencing, to micro-to-mainframe connection, CN '87 will show you how to improve productivity, performance and the bottom line!

## Test, Evaluate, Compare—Solve Telecom Problems

Bring your shopping list, your wish list, your problems. You'll go home with solutions, ideas, hard facts. As *the premiere* telecommunications show, CN '87 offers you the best representation of the leading, most innovative vendors. Come to CN '87 prepared to discuss your specific needs, to get answers to your most difficult questions, to solve your most complex problems.

## CN '87 Gives You the First Look At New Products And Breakthrough Technologies

Because CN is known throughout the industry as *the* prestigious show, vendors launch more new products here and demonstrate more leading-edge technologies. Nowhere else under one roof will you have direct access to what's new in all areas of telecommunications.

## Meet Your Peers, Your Best Prospects

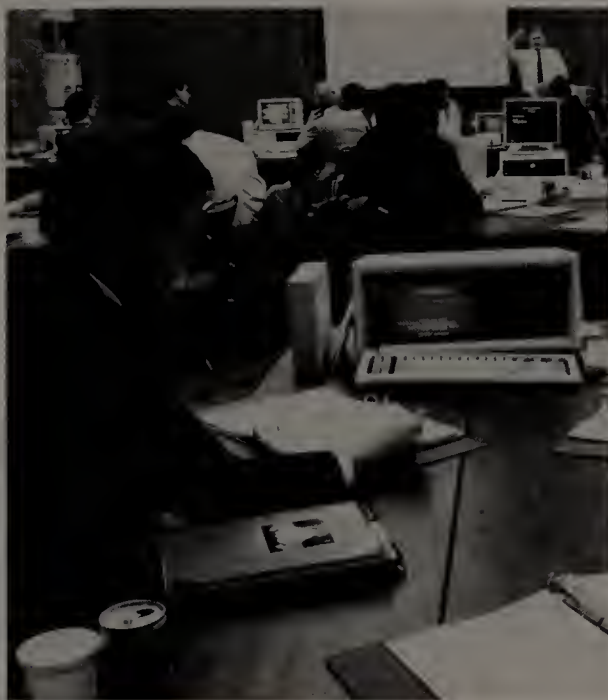
Movers and shakers . . . decision-makers . . . industry innovators . . . you'll meet them all at the expo, have a chance to chat in tutorials and conference sessions. Every year, CN draws a bigger, better crowd. Attendance is expected to top 17,000, well over 1986's 15,000. As our industry grows in size and importance, CN is increasingly recognized as *the* place to be!

## CN '87 Is Expo PLUS "In-depth" Tutorials And Comprehensive Conference Program

From February 9-12, the Washington Convention Center is your telecommunications university. You'll discuss and learn about important issues and significant new technologies and find out their impact on your organization. CN's "In-depth" tutorials for CEU credit, the keynote speakers who are major forces in the industry and its prestigious conference program are designed to keep you at the forefront in knowledge of our industry.

## Learn Latest About VSAT, Token-Rings, Strategic Planning—And More

Select an "In-depth" tutorial from the series that takes place on Monday, February 9. You'll get Continuing Education Units credit and certificate in recognition of your attendance. Do you need to closely monitor the regulation scene? Or specific technical data? Are you a Senior Manager who needs to understand the impact of telecom developments? Choose from over 65 conference offerings during the show, Tuesday through Thursday, according to your particular needs and areas of responsibility.



## Washington, D.C. Is Where It's At

Stately monuments . . . hallowed halls, glorious treasures and artwork of past and present . . . for sightseeing, shopping, fine dining and more. Our nation's capital makes the perfect site for CN '87. See last page for hotel and travel information and how to SAVE on both.

## More Attendee Services

Thoughtful planning at every step makes best use of your valuable time. You're here to do business, we've made that as pleasant, easy as possible. The full-service message center in main lobby handles incoming calls, helps you stay in touch with your office. Also in the lobby is help with taxis and the METRO,<sup>®</sup> the capital's rapid transit system, hotel shuttle buses and airport transportation. The spacious luncheon area seats over 2,200 so waiting is minimized and you don't waste time.



## Communication Networks

Through the changing tides...

Communication Networks (CN) Conference and Exposition, founded in 1979, is an educational and industry event that has spanned the introduction of new communications technologies such as satellite business networks, fiber optics, LANs, and specialized common carriers.

CN is based on a conviction and concept put forth by Richard E. Wiley when he was in private communications law practice after a term as Chairman of the FCC. Wiley envisioned the technical and applications unity of voice and data networks and the scope of market opportunities available under deregulation.

Since the first show in 1979, CN has grown in size and scope and increased its number of exhibitors and attendees almost 20 times. For the rich diversity of products and services on exhibit and for its outstanding programs developed to address the most significant issues in telecommunications today, CN deserves its standing as the premiere show in our industry.



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Industry Keynote: **John Lemasters**, President and CEO, Contel Corp.



Policy Keynote: **Alfred Sikes**, Assistant Secretary for Communications and Information, NTIA, Dept. of Congress



Technical Keynote: **Lincoln Faurer**, President and CEO, Corporation for Open Systems

#### Featured Speakers



Viewpoint: **Howard Anderson**, Managing Director, The Yankee Group



Hotseat: **Harry Newton**, Publisher, Teleconnect Magazine



Strategy: **Dr. Dixon Doll**, Chairman, The DMW Group

# CN '87 gets you ready for challenges ahead with—

**"In-depth" tutorials on key data/voice/telecom topics  
Monday, February 9, 1987**

**Register now to guarantee enrollment**

**Call TOLL-FREE 1-800-225-4698**

In every way, Communication Networks '87 is a time of discovery.

And you can give your career—and your company—a significant boost by attending a CN '87 intensive "In-depth" tutorial on Monday, February 9, one day prior to the opening of the show floor.

Take advantage of this opportunity—it only comes once a year—and take part in the most comprehensive one-day learning experience in the industry. Each tutorial puts you face-to-face with a top telecom professional, selected by CN as the industry's leading expert on a given topic.

You'll be invited to ask questions pertinent to your organization in each tutorial. You'll

benefit from colleagues as they share their experiences in solving problems similar to yours and you'll learn much about how to relate trends and products to your organizational needs.

#### **For All Telecom Professionals—Technical, Non-Technical, Introductory to Advanced**

Attend the tutorial that addresses topics most important to you. You'll qualify for Continuing Education Units and certificate. Please note tutorials are rated as introductory, intermediate and advanced so you're sure of reaping maximum benefit from the tutorial you select.

# "In-depth" tutorials on key data/voice/telecom topics

**Date: Monday, February 9, 1987**

**Time: 9:30 am–5:30 pm**

**Place: COMMUNICATION NETWORKS '87  
Washington Convention Center, Washington, D.C.**

Check ☒ tutorial listings below and select one you'll profit from most:

#### ☐ **T-1 Open Systems Integration (OSI)— A Technical and Strategic Review**

Leader: Harold C. Folts, Executive Director, OMNICOM Inc.

Gain a thorough understanding of concepts and terminology of OSI, a working knowledge of OSI architecture, an introduction to the 7 layers of OSI protocols, and expert guidance in applying OSI to the evolution of distributed information systems. Examine all practical realities facing corporations as they

move into OSI implementations.  
Level: *Intermediate*

#### ☐ **T-2 ISDN—Status and Developments** Leaders: James G. Herman, Director and Mary A. Johnston, Senior Consultant, Telecommunications Consulting Group, BBN Communications

Learn *exactly* what ISDN will and won't deliver in the late 1980s, what emerging ISDN standards will mean for new services and improved network performance, what holes still exist in the standards and trials, how to make smart buying decisions while keeping your options for ISDN compatibility and more.

Level: *Intermediate*



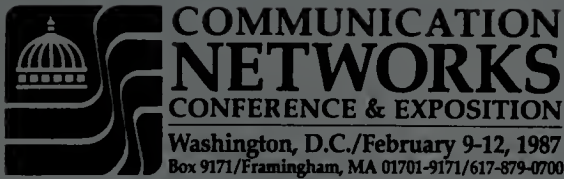
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- ☐ Please register me for the all-day "In-depth" tutorial (Feb. 9) that I have chosen below. My registration also includes full admission to the three-day Conference and Expo (Feb. 10-12), including seminars and exhibits. Reserve space for me in this tutorial: T-\_\_\_\_\_ \$695
  - ☐ Please register me for the three-day Conference and Expo (Feb. 10-12). \$495
  - ☐ Please register me for the all-day "In-depth" tutorial (Feb. 9) that I have chosen below. My registration also includes admission to Expo (Feb. 10-12). Reserve space for me in this tutorial: T-\_\_\_\_\_ \$295
  - ☐ Please register me for one day at CN '87. My registration includes admission to the Conference and Expo. Reserve space for me on: Tues., Wed., Thurs. (Circle one only.) \$195
  - ☐ Please register me for the Expo at CN '87. (In order to receive your exhibits-only badge you must fill out the form below. No calls please.) FREE
  - ☐ Please send me a complete show agenda.
- All prices include lunch, coffee breaks and tutorial materials.

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### □ T-3 Strategic Planning for Corporate Information Networks

Leader: Dr. Howard Frank, Consultant, Howard Frank Associates

This tutorial will help you in making key decisions affecting every area, even the very core of your organization. Learn how to relate vendor offerings and technological trends to your organization's needs and requirements and how to develop a framework to plan future services, systems. Examine current issues in network integration, why communications departments must function as "mini telcos," the pros and cons of software-defined networks and private dedicated networks.

Level: *Introductory-Intermediate*

### □ T-4 Planning and Designing Networks with the New Technology

Leader: Dr. John M. McQuillan, President, McQuillan Consulting

In this intensive seminar you get acquainted with key architectural principles used by today's leading network planners and understand their application in several case studies. Review emerging technologies, T-1 networks, hybrids, VSATs, gateways between SNA, LANs and X.25, micro-to-mainframe links, intercompany networks and more.

Level: *Advanced*

### □ T-5 Building the Network Management and Technical Control Facility

Leader: Gabriel Kasperek, President, Kazcom Inc.

Understand the strategic value of network control, explore alternative technologies for managing your network and find out how to evaluate current technologies for use in your own organization. You'll also learn about test equipment you need for successful network control as well as industry trends and directions for the future.

### □ T-6 Designing Voice and Data Networks under the New Tariffs

Leader: Robert L. Ellis, President, The ARIES Group Inc.

Prepare to maximize opportunities, minimize pitfalls of post-divestiture tariffs. Take this tutorial to learn the structure of new tariffs, the latest January '87 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics involved in configuring data networks, the LATA-pure strategy—and more.

### □ T-7 Managing the Telecommunications Resource

Leader: Gerald P. Ryan, President and Founder, Connections Telecommunications Inc.

How to develop a successful management environment, what tools to use to do your job more professionally, how to plan a network management center, how to staff and train the department, how to prepare and substantiate departmental budgets are topics covered in this highly intensive session.

### □ T-8 IBM Token-Ring Versus Other LAN Choices

Leader: Dr. Kenneth J. Thurber, President, Architecture Technology Corp.

For the benefits—and headaches—of IBM's controversial Token-Ring technology, this tutorial gives you a total overview of announced products, future plans, compatible products and IBM's overall strategy. You'll discuss Token-Ring's relationship to IEEE 802.5 and get an in-depth look at NETBIOS and APPC/LU 6.2 interfaces, and more.

Level: *Intermediate*

### □ T-9 VSAT Technology and Implementation

Leader: Dr. Jerome G. Lucas, President, TeleStrategies Inc.

Learn the basics of applying very small aperture terminal (VSAT) satellite communications to your networking needs. You'll learn about basic application requirements in SNA networking, data broadcasting, PC networking, video broadcasting and teleconferencing. An overview of service offerings and vendors is provided.

### □ T-10 IBM's Systems Network Architecture (SNA): A Detailed Road Map

Leader: Daniel Zatyko, President, Zatyko Associates

Enroll in this intensive one-day tutorial to understand the evolution of SNA and learn fundamental SNA concepts, the 7 SNA architectural layers, SNA's physical and logical addressing strategies, SNA products, components of NetView, Token-Ring networks, functionality and capabilities of the LU 6.2/APPC and NETBIOS interfaces and more.

Level: *Intermediate*

### □ T-11 An Introduction to Data Communications Today

Leader: Gary Audin, President, Delphi Inc.

Gain a comprehensive and practical understanding of data communications in this course. Learn about basic concepts, terminology and technology and how various networks operate and how to select them; how best to interconnect computers, terminals and PCs using different protocols; and what software is necessary to support protocols and network management.

Level: *Introductory*

### □ T-12 Understanding the Communications Regulatory Environment

Leader: Richard E. Wiley, Senior Partner, Wiley, Rein & Fielding

This tutorial leads you through the maze of regulatory bodies here and abroad. Learn how telecommunications policy is made and changed, what agencies are active in policy-making, how industry segments are affected by current policies, what key issues are now under consideration and how you can influence future decisions.

Level: *Introductory*

## Town Meeting

### Modified Final Judgement—Anti-trust Settlement Impact on the Telecommunications Industry After Five Years

Since divestiture, the telecommunications industry, regulatory agencies, Congress and Judge Greene's court have been adapting to the brave new world of telecom. This year's Town Meeting—always a popular session—will reflect on the Modified Final Judgement. Join **Richard Wiley**, Conference General Chairman, and participate in a lively debate with these major players:



**Robert Allen**, President and COO, AT&T



**Samuel Ginn**, Vice Chairman of the Board, President and CEO, PacTel Corp.



**Albert Halprin**, Chief, Common Carrier Bureau, FCC



**Peter Huber**, Consultant, Dept. of Justice



**William McGowan**, Chairman and CEO, MCI Communications Corp.



**Richard Wiley**, Senior Partner, Wiley, Rein & Fielding



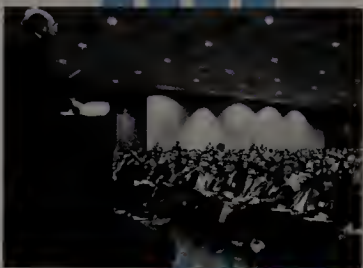
# Conference Program



## Early Bird Basic Sessions

7:30–8:20 am

A series of solid, basic presentations starting from square 1 and explaining ATCAs (All Those Confusing Acronyms). The Early Bird series is by request, based on feedback from '86 attendees. Designed for people new to telecommunications or experienced professionals with expanded responsibilities in new areas.



CN's growth and experience guarantees you a conference program committed to vital issues you face today

As you know, no one can say truthfully that it's easy to keep abreast of the fast-moving world of telecommunications. Yet rapid change, technological breakthroughs, issues surrounding deregulation, and many other factors make accurate, up-to-the-minute knowledge absolutely essential.

### Yes, You May Have to Roll Up Your Sleeves— (but then, knowledge is POWER!)

What CN's experience and clout *can* do for you is provide an exchange of latest data and forum for discussion with the most-respected, top authorities in telecommunications in a conference program that may well be the high point of your year. The sessions you attend are *substantive presentations*, not sales pitches. Many topics are by request from previous attendees and/or the result of CN's extensive review and evaluation procedures of past programs.

### Don't Re-Invent the Wheel

Take advantage of CN's conference program consisting of more than 65 intensive 90-minute sessions, presentations and discussions. Organized along eight tracks, each session deals extensively with a specific area of interest. Learn from technical wizards, legal eagles and experts who've already checked out the latest products and technologies.

## Program Tracks

The eight tracks of conference sessions cover a comprehensive range of topics. The track titles provide an indication of the breadth of topics to be presented at Communication Networks '87.

### Strategic Business Perspectives

Take this track to sharpen managerial decisions. It will cover the major shifts in the telecommunications industry and their business implications. Also covers breakthrough technologies, significant market realignment and the new networking environment.

### Washington Scene

Select this track and be prepared for shifts in regulatory practice. Unique to CN, this track covers how regulation, deregulation and re-regulation are likely to affect telecommunications users and vendors in 1987 and beyond.

### Technology Briefing

In a technical area and need leading-edge data? These sessions offer a detailed look at

specific technologies by leading research contributors. Presentations assume attendees have a high level of technical knowledge. Not for beginners.

### User Case Studies

Profit from others' triumphs, their traumas. Take advantage of your peers' experiences in addressing specific business needs with telecommunications technologies. These sessions deal with both technical issues and economic justification.

### Industry Issues: Pro & Con

Controversy can pay off—and is very much part of our fast-paced industry. Here are opposing viewpoints presented by intellectual antagonists, emphasizing questions of real implementation payoffs for users, market potential for vendors and the public interest.

### Voice Networking Issues

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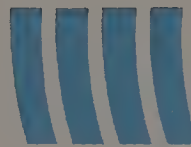


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# COMMUNICATIONS MANAGER

## Micro links up 55%

According to the American Management Association's (AMA) "1986 Report on Information Centers," the number of personal computers linked to mainframes or minicomputers grew by 55% during 1986. For more information on the report, contact the AMA, 135 W. 50th St., New York, N.Y. 10020.

### ► PLANNING

## Build security into networks

*Threats come from several sources.*

BY NADINE WANDZILAK  
Staff Writer

Too often, security is the last thing on the minds of local-area network users.

Most local net users carefully explore the applications they want their networks to support and spend a good deal of time selecting and installing the system. But it isn't until long after the local network is up and running that most users face the tough issue of security.

"Users are only now beginning to emphasize security during the local network design phase," said Jerry FitzGerald, principal in the Redwood City, Calif.-based management consulting firm of Jerry FitzGerald & Associates. "Up until now, they have always put their systems in and then added security systems after the fact. The need crept up on American business. Suddenly a lot of people realized they should have done this before."

### Costs can be high

Ignoring security can be a costly

oversight. According to FitzGerald, retrofitting a local network with security hardware and software can be many times more costly than building those features in at the beginning. The loss of sensitive information due to an unsecured local net may be devastating.

Experts say local net users often focus only on preventing unwarranted access to the network in addressing security. But security can be jeopardized by something as simple as leaving a diskette on a desk, said Leonard Gilbert, managing partner of Coopers & Lybrand's Computer Audit Assistance Group, Southeast Region. The diskette can end up in someone's attache case — or in a wastebasket.

Companies can also lose valuable information when authorized users create their own data bases of information separate from the central corporate data base. In time, the corporation may lose control of this information asset, FitzGerald warned.

Also, as users increasingly link local-area nets to other local nets or corporatewide backbone nets, the

information that can be accessed increases by at least tenfold, FitzGerald said.

Thus, organizations that once gave little thought to the security of their stand-alone networks are forced to retrofit those now wide-reaching nets with security systems.

"Even if they are individually secure, when a local net and a mainframe are connected, the connection opens the security gate," said Stuart Henderson, manager of the Management Consultant Services Division of Coopers & Lybrand in New York.

Often, the decision to link a local net and another system is made quickly, according to Henderson. "It's not as if a manager wants to introduce security flaws, but he's got tremendous business pressure to hook systems up. People aren't asking if you've evaluated security," he said. "They're asking how soon you can make the connection." Users also face problems integrating security tools on different systems, he added.

To evaluate the security of a local-area network, FitzGerald identifies all threats, including unauthorized access, fraud, lost data and error. Then he identifies the physical components: cable, terminals, microprocessors and net users. He pairs each threat with each component to devise a list of controls that might be implemented to mitigate each threat. For example, for the threat of unauthorized access, the solution might be a password to restrict users to certain files or nets. Without this frame of

reference, "I've seen people hand a vendor a whole list of security controls," he said. "But the vendor can't see where they need them or why they need them."

### Three components

Proper security is based on three components, FitzGerald said: something you know, such as a password; something you have, such as a key that makes the system a little more secure; and finally, something you are, such as a fingerprint or voiceprint that identifies the user. The "something you are" device is best, but may be too expensive. "If you have a big net with 2,000 terminals, a company won't spend \$2,000 per terminal for voiceprints," he said.

The amount of money spent on security should be directly proportional to the sensitivity of the data to be transmitted over the local net or the other networks to which it is connected.

In high security applications such as international monetary transfers, a company might spend as much as 10% to 20% of the price of the local-area net on security, FitzGerald said. For less sensitive applications, a user might spend 2% to 5%, he said.

To make a local-area network more secure, FitzGerald offered several recommendations.

- Start to plan for local net security when local net installation is first considered. That way, adopting security measures becomes a task that must be performed.
- Include a budget line item for security hardware and software in the local net budget.
- Have vendors bid on a local net security system just as they might bid on network hardware and software. Vendors are providing good test, evaluation and local net management tools, according to FitzGerald. "But individual local-area network vendors seem to let you get your security wherever you can."
- In a large company, create a corporate information security group made up of people from outside the data processing department to be responsible for local net security.
- In a smaller company, where forming a security group may not be feasible, ask an auditor to review security facilities built into the net. A security review by an outsider might cost anywhere from \$1,000 to \$5,000, FitzGerald said.
- Control local-area network access with file-restricting software that can be loaded into the file server.
- Consider encryption systems or fiber-optic cable. Fiber-optic cable is more secure than any other cabling, FitzGerald claimed. Also, "the cost of fiber-optic cable is dropping rapidly," he noted. ▀

### GUIDELINES BRUCE HOARD

## Beware of bedazzling benchmarks

In this day and age of new-found competition in the communications industry, it is inevitable that eager vendors will go all out in their efforts to promote themselves. That means users must be ever vigilant against runaway marketing hype in its many pernicious forms.

For instance, benchmark tests are very handy marketing tools. Vendor A can very easily establish conditions under which his product will excel compared to that of Vendor B. Insofar as those particular conditions go, the tests may be credible.

However, what Vendor A may not be honestly telling the user

is how his product or products perform under a wider variety of test conditions, conditions that may be very common to the user's particular communications environment.

Therefore, beware. Insist that Vendor A describe how his products perform under conditions that arise on a day-to-day basis. Also, ask the vendor if his competitors were asked to participate in the actual test. If the competition was not given the opportunity to participate, it is very doubtful that its products were showcased in their optimal configuration.

If the competition was not asked to be physically present at the tests, was it at least asked for input on test parameters?

Again, lack of Vendor B input will more than likely lead to a situation in which Vendor B's products will perform in a less-than-optimal mode.

In addition, users should make sure Vendor A is comparing apples to apples. If Vendor B's products don't fare well in benchmark tests, perhaps those products were not designed to be direct competitors to Vendor A's in the first place.

Benchmark tests can be useful. But in order to be useful, they must be performed in an environment that guarantees fairness. Before the user makes any important and irrevocable commitments based on benchmarks, he should make sure they meet this criterion.

*Hoard is editor of Network World.*

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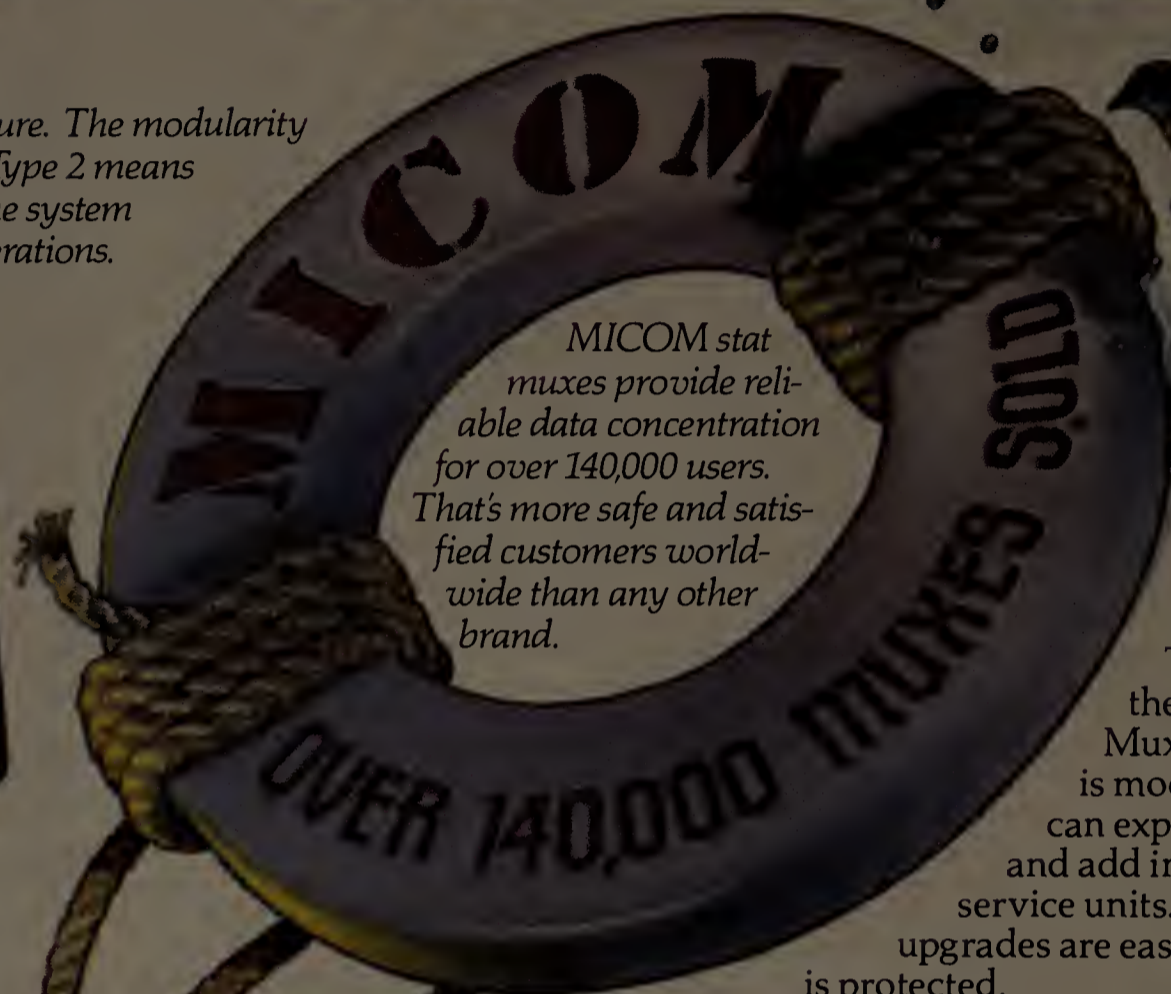
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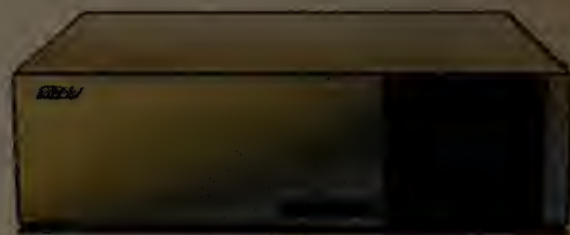
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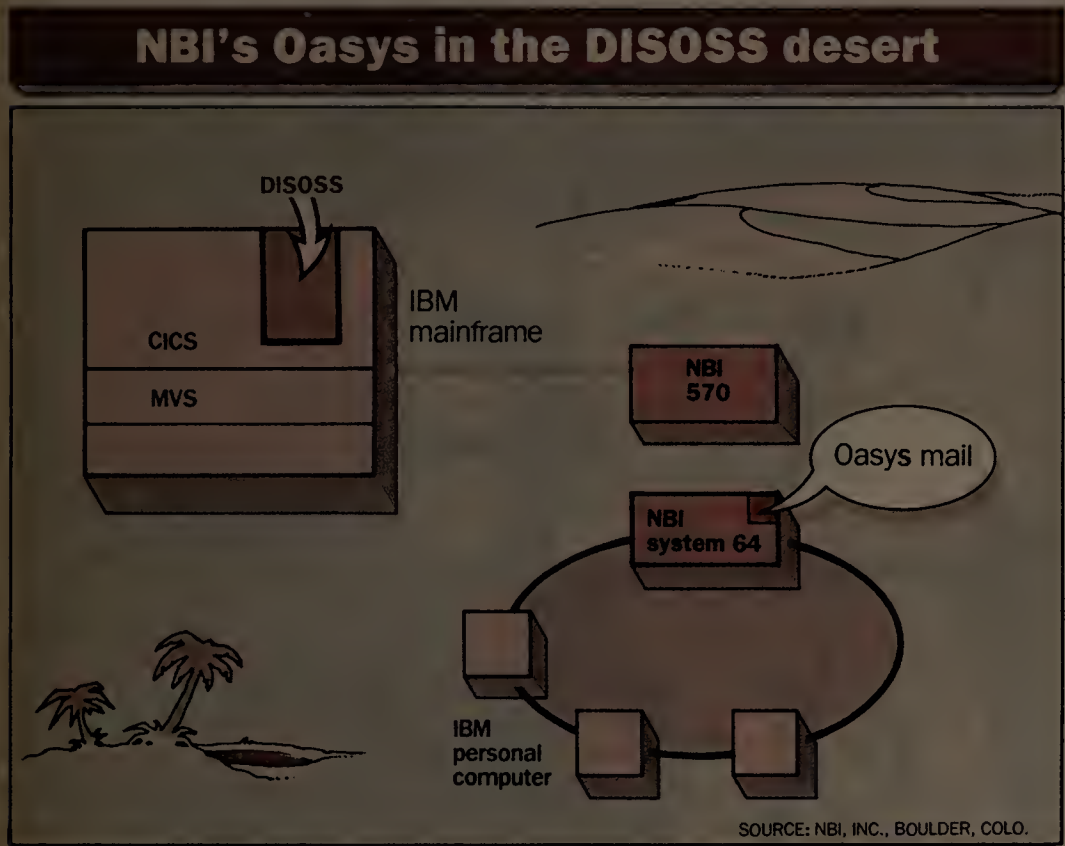


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# NEW PRODUCTS AND SERVICES

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► E-MAIL GATEWAY

## Yet another DISOSS link hits the systems street

*Runs on NBI 570 departmental unit.*

**BY PAUL KORZENIOWSKI**  
Senior Editor

BOULDER, Colo. — Another company jumped on IBM's DISOSS bandwagon as NBI, Inc. announced a gateway between DISOSS and its Oasys Mail system.

A number of vendors have been adding DISOSS support to their products, despite the fact that it has been criticized for being difficult to use and expensive to operate.

Oasys Mail runs on an NBI System 64 micro and enables IBM Personal Computer users to share PC-DOS files.

DISOSS, a CICS application program, supplies electronic mail and library service capabilities.

NBI's gateway runs on an NBI 570 departmental computer based on a Motorola, Inc. 68020 microprocessor. Other applications in addition to the gateway can be run on the System 64. Departmental systems can be connected to System 64s by NBI's implementation of Ethernet.

NBI becomes the first vendor to offer an interface between a personal computer E-mail system and DISOSS.

The gateway translates Oasys Mail documents to IBM's Document Interchange Architecture format and vice versa. The gateway enables users to exchange both revisable and final-form documents. The NBI 570 looks like a send/receive node to DISOSS and uses IBM's LU 6.2 protocol to move documents between the systems. Since the product works with LU 6.2 protocols, it does not require any terminal emulation software.

The package supports only DISOSS' E-mail capabilities and cannot work with DISOSS' library services.

A spokesman for NBI said that the company plans to add library service support to the product. He added that the product has been in beta testing at three sites.

NBI's DISOSS gateway sells for \$7,000, and Oasys Mail costs \$7,500. ▣

*“NBI becomes the first vendor to offer an interface between a personal computer E-mail system and DISOSS.”*

► COMMUNICATIONS CONNECTIONS

## Upstart unveils CPU link units

*NTX channel-to-channel processors to threaten IBM mainframe revenue.*

**BY JIM BROWN**  
New Products Editor

SUNNYVALE, Calif. — Upstart NTX Communications Corp. added three models to its line of communications processors that support channel-to-channel connections.

The devices work with IBM and IBM-compatible mainframes using the MVS operating system and VTAM in a Systems Network Architecture environment. The units are driven by NTX's mainframe-resident Cross Domain Control Program package, which implements the data link control layer that pro-

vides an interface between VTAM and the NTX hardware.

The firm unveiled the NTX 3800 Model 2.1, NTX 3800 Model 2.2 and NTX 3800 Model 2.3 to complement its previously released NTX 3800 Model 2. Each model supports connection of up to four full-duplex communications lines, and up to four channel adapters attach directly to a mainframe's block multiplexer channel. However, only two channel adapters can run concurrently, with the other two providing redundant connection to the mainframe. The devices support

See NTX page 45

► SYNCHRONOUS COMMUNICATIONS

## Modem line unveiled for private lines

SUNRISE, Fla. — A trio of modems designed for synchronous communications over leased lines were unveiled by Racal-Milgo, Inc.

The firm's RM series of modems includes the RM-4800, the RM-4827 and the RM-9629. Each features internal software accessed from a touch-sensitive front panel.

The front panel is used to configure the unit, perform diagnostics and do local and remote line testing.

The diagnostics include monitoring port speed, receiving levels and signal quality. The loop-back testing includes digital and analog loop-backs, unit self-tests and end-to-end tests.

The RM-4800 operates at speeds up to 4.8K bit/sec over 4-wire point-to-point and multipoint voice-grade private lines. It includes built-in local and remote test capability and is compatible with the CCITT V.27bis standard. It has an option that will add a 2-port time division multiplexer (TDM).

The RM-4827 also operates at

4.8K bit/sec over 4-wire voice-grade private lines in point-to-point and multipoint environments or over 2-wire dial-up lines. It is compatible with the CCITT V.27bis/ter standards. It has several options, including the 2-port TDM, a 4-port modem-sharing capability, dial-up operation and integral support for asynchronous operation.

The RM-9629 operates at 9.6K bit/sec over 4-wire point-to-point and multipoint voice-grade private lines. It is compatible with the CCITT's V.29 standard.

The RM-4800 and RM-4827 use a differential 8-phase modulation technique when operating at 4.8K bit/sec and a differential 4-phase modulation technique when operating at the 2,400 bit/sec fallback rate. The RM-9629 uses an 8-phase amplitude modulation technique.

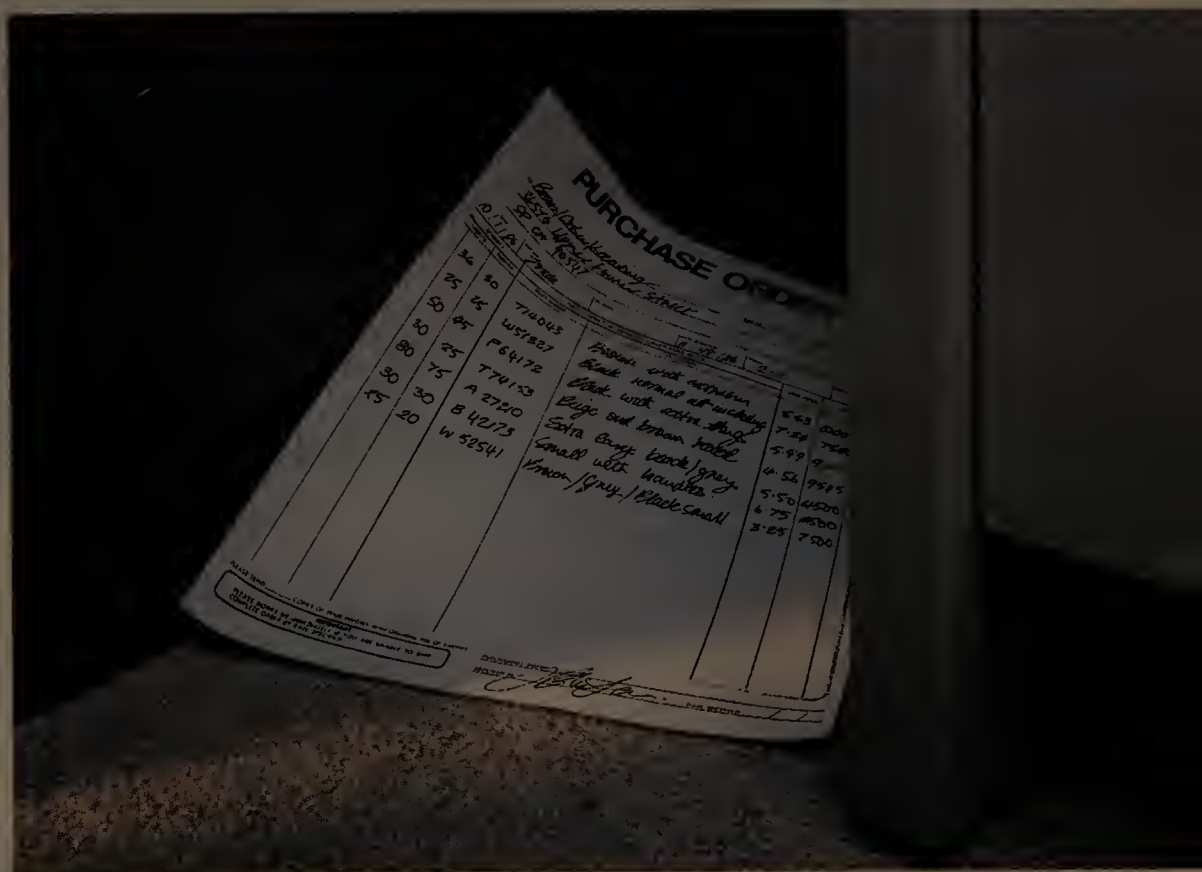
Each unit operates in full-duplex, with the exception of the RM-4827, which also runs in half-duplex as well.

An RM-4800 costs \$950, while the RM-4827 is priced at \$1,250. The RM-9629 costs \$1,850. ▣

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## Products & Services

### On-line protocol testing application program library

**Atlantic Research Corp.'s Teleproducts Division** introduced a free on-line application program library for users of Atlantic Research's Interview line of test equipment.

The ARC Application Resource Center (ARC ACCESS) allows registered service users to download Systems Network Architecture, X.25, Binary Synchronous Communications and other protocol-testing application programs. Users can download programs and documentation with an ASCII terminal, personal computer or Atlantic Research data analyzer and a 1,200 bit/sec asynchronous modem. To register, contact Atlantic Research Customer Support at (703) 644-9190.

Prospective users of Atlantic Research equipment may access and browse the library's program list, news and network testing tips by calling (703) 644-9253. The access code is "guest."

*Atlantic Research Corp., Teleproducts Division, 7401 Boston Blvd., Springfield, Va. 22153 (703) 644-9190.*

### DCA upgrades Smart Alec emulation software

**Digital Communications Associates, Inc.** released Version 1.5 of its Smart Alec package that links IBM Personal Computers to IBM System/38, System/36 or System/34 minicomputers.

The package makes a Personal Computer look like an IBM 5251 Model 11, 5291 or 5292 Model 1 terminal. The new release makes a personal computer-attached printer look like an IBM 5219, 5224, 5225, 4214 or 5256 printer. Version 1.5 is also reportedly compatible with software written for IBM's Enhanced 5250 Application Program Interface (API) including IBM's PC Support/36, PC Support/38, Personal Services/36, File Support Utility and File Transfer Utility as well as third-party packages complying with API.

The upgraded Smart Alec software also allows a user to configure the personal computer keyboard to mirror the firm's IRMA E78 emulator when running IBM's 3270 pass-through software.

Smart Alec is \$895.

*Digital Communications Associates, Inc., 1000 Alderman Drive, Alpharetta, Ga. 30201 (404) 442-4232.*

### PC-based remote job entry emulation package upgrade

**Network Software Associates, Inc.** upgraded its AdaptSNA RJE package, a micro-to-mainframe package emulating IBM 3770 remote job entry functions.

Enhancements to AdaptSNA RJE Version 3 include support for two

concurrent print sessions, a configurable print spooler, user-definable soft keys and a transmission trace facility. Each printer can print a different host file simultaneously. The upgrade also offers an on-line interactive tutorial that instructs IBM Personal Computer users on the use of bulk file transfers via remote job entry.

Version 3 will be positioned as an advanced package for \$785. The company will still market Version 2 as a basic version for \$585.

*Network Software Associates, Inc., 22982 Mill Creek, Laguna Hills, Calif. 92653 (714) 768-4013.*

### File-transfer added to GamaFax package

**GamaLink** added a file transfer capability to its GamaFax personal computer-to-facsimile communications package that supports personal computer-to-personal computer file transfers.

The package now allows users to send personal computer files, including ASCII documents such as spreadsheets and word processing files, over telephone lines to another personal computer at 9.6K bit/sec. The product's board and menu-driven software support synchro-

nous communications.

The package costs \$995.

*GammaLink, 2452 Embarcadero Way, Palo Alto, Calif. 94303 (415) 856-7421.*

### Seven-channel switching statistical multiplexer

**Astrocom Corp.** announced a 7-channel switching statistical multiplexer that features a flow control and 32K internal buffer.

The SX-7 includes a port-selection feature that allows users to access both local and remote ports.

# AT&T IS IN TOUCH HERE AND



No matter what industry you're in, AT&T recognizes your need to conduct business all over the world. So AT&T can provide you with international telecommunications services that give you most of the benefits you enjoy domestically, overseas.

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AT&T International ACCUNET® Packet Service, which provides you with a reasonable cost high performance packet switching interface for international data transport.

And AT&T International Private Line Service, which answers your need for a rapid flow of both voice communications and data transmissions. It offers a more efficient, direct link between your company headquarters and its branches.

Of course, AT&T understands that all your communications needs must be met quickly and efficiently. So just as AT&T works together with foreign telephone companies to

# Products & Services

The SX-7 is configured from a main menu, and set-up parameters are stored in a nonvolatile, random-access memory.

The device is compatible with computers using Hewlett-Packard Co.'s INQ/ACK protocol as well as computers using ASCII and synchronous protocols. The multiplexer comes with an RS-232 interface and supports full-duplex synchronous modem operation at up to 9.6K bit/sec.

The SX-7 costs \$1,395.  
Astrocom Corp., 120 W. Plato Blvd., St. Paul, Minn. 55107 (612) 227-8651.

## Package supports PC-to-facsimile transmission

**Carterfone Communications Corp.**, a subsidiary of Cable & Wireless of North America, announced a package allowing a personal computer to send a document to a facsimile machine.

The **Reachfax** package is based on Carterfone's PC Reach communications software and allows a personal computer to send or receive a document from a facsimile machine that meets the CCITT Group III standard.

The offering consists of an on-

board modem and menu-driven software with a toggle key between the application and the communications package, as well as a dialing directory.

## CRC error-check protocol

The package incorporates a cyclic redundancy check-type error-protection protocol and operates at speeds between 300 bit/sec and 19.2K bit/sec.

Reachfax is priced at \$1,195.  
Cable & Wireless/Carterfone, 1341 W. Mockingbird Lane, West Tower, Dallas, Texas 75247 (214) 630-9700. ☐

**NTX from page 41**  
DS1, V.35, RS-449 or RS-422 interfaces.

The Model 2.1 supports communications line speeds up to 512K bit/sec, while the Model 2.2 supports line speeds up to 1.024M bit/sec. The Model 2.3 supports line speeds up to 1.544M bit/sec. The Model 2 reportedly supports four lines operating at T-1 speeds of 1.544M bit/sec or a single line operating at 6.312M bit/sec. Each NTX unit is field-upgradeable.

According to Richard LeCour, vice-president of product marketing, the units accept data at the block multiplexer channel rate of 24M bit/sec and store it in an internal buffer. While in the buffer, the data is serialized and allowed to trickle onto the communications line at the line operating speed. The unit also stores data it has received from the communications line in a buffer. The data is converted to parallel form and transferred to the mainframe at the block multiplexer channel rate.

The devices will support both bulk data transfer and interactive traffic. "We have a high-speed device that will provide bulk data transfers at up to 1.5M bit/sec per line or interactive traffic with a channel-to-channel response time," McKenna said. "Once our address is identified in VTAM, we take over all the buffering and the movement of data that VTAM has addressed to the channel-to-channel adapter at T-1 speeds."

McKenna said the device could be used to connect a local mainframe to a remote host. The connection would enable the two devices to share work more economically and postpone the need to upgrade to more powerful processors. "We provide a product that could potentially erode the CPU revenue stream from IBM," he said.

NTX claims the error-checking and correction scheme included in its NTX Data Link Control, an implementation of IBM's High-Level Data Link Control, assures a line-utilization rate of 90% for both terrestrial and satellite communications links.

Each NTX 3800 unit features switchable mainframe channel connections, an interface between the device and the communications line, redundant internal data buffers with error checking and correction logic, redundant power and visual fault indicators.

Each device is also equipped with a diagnostic processor used for fault isolation and analysis. That diagnostic processor talks over a low-speed asynchronous communications line with a network control center.

McKenna said the firm has shipped 15 devices to four large customers including New Jersey Bell and US Sprint Communications Co. Those installed devices are linking IBM 3090 Model 200 and 3080 mainframes as well as AMDahl Corp. 5880s.

NTX said the NTX 3800 Model 2 series ranges in price from \$87,000 to \$275,000. That does not include the \$1,500 per month software license for each mainframe. ☐

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# Opinions

## VENDOR ISSUES

DAVID G. LEEPER

# A call for customization

Early one morning, the communications manager of a large corporation, frustrated by hackers' repeated attempts to dial into his company's data bases, asks his local telephone company for help.

A special small-team project is launched, and six months later, a network-assisted access security system is successfully operating.

Any call to the company's computer center is momentarily suspended in the telephone network while a data query containing the caller's number is launched to the company's computer.

If the computer returns positive authorization, the call is allowed to complete. If not, the call is routed to a voice announcement denying access.

What does this anecdote have to do with network planning? Plenty.

One approach to network planning is to do it on a grand scale as Bell Communications Research, Inc. (Bellcore) and the rest of the industry are doing with Integrated Services Digital Network.

But as network planners, vendors should balance their grand-scale planning with an active program of custom-tailored solutions to individual customer needs.

In particular, vendors should use an aggressive "build-it-and-try-it" approach to

testing new service ideas.

Of course, integrated high-level planning, user needs analyses, focus groups, market studies, transition plans and all the traditional network planning tools will always be needed. But these grand-scale tools should not let vendors foster a "home run only" mentality. It is equally important for the vendor to maximize opportunity, or its "times at bat," by providing one-at-a-time solutions to particular customer problems.

Bellcore is finding that small, innovative "skunkworks," or independent groups of experts working on special projects, that use recent-technology programmable switches and small computers are an excellent way to explore the market, maintain contact with customers, show responsiveness to user needs and point the way for future network planning.

The previously mentioned story is not fiction. A team of problem-solvers from Bellcore, a local operating company and a corporate customer made it happen. This shows the kind of service that the real-time control of intelligent networks and the signaling capabilities of ISDN will one day make possible on a low-cost, routine basis.

Including small, tailored solutions as part of a vendor's network planning strategy has many advantages. First, small service trials and projects help to break the chicken-egg cycle associated with major network planning initiatives such as ISDN and Bellcore's Intelligent Network project. In this scenario,

a dilemma develops in which an expenditure for a trial must be justified, but the information necessary to justify it must be derived from the trial. The investments called for by these initiatives are difficult to map out in advance without clear sources of new revenue or cost savings. However, successful ad hoc solutions stimulate demand and provide concrete data on the economic potential of new services.

Second, no matter how hard a vendor tries to make the right predictions, the process of creating a new service will always contain an irreducible element of trial and error. By keeping costs and turnaround time low, the vendor can afford more trials.

Third, by helping to provide custom-tailored solutions, the vendor not only becomes more responsive, it also joins the user on the learning curve. This is desirable for vendors since network users have long been a major source of innovative ideas.

Fourth, small trials are easy to manage because they are especially appropriate for small entrepreneurial teams. Small teams develop a pride and dedication that help them overcome the obstacles that inevitably appear in every project.

In the past, providing a customized network service was so time-consuming and expensive that such projects were rarely undertaken by large network providers. Fortunately, new technologies make the process much faster and less expensive.

See **Customization** page 48

*Leeper is division manager of new service technology applications at Bell Communications Research, Inc. in Livingston, N.J.*

## LAN STRATEGIES

RANDY FOLDVIK

# IBM nudges Novell

Local-area networks have finally begun to emerge from the pages of trade journals into the corporate office environment.

As much as anyone else, Novell, Inc. and IBM are responsible for this recent legitimization of the local network. At this point, their products are compatible and complementary.

However, a confrontation is developing that could have serious consequences for Novell. How the company reacts to this challenge will largely determine its future with large corporate users.

Novell has emerged as a market leader with its local net file server operating system. It outperforms its closest competitors, will run on almost any type of local network hardware, and its versatility and effective performance have made it a de facto standard in the industry.

IBM has contributed a great deal to legitimizing the local-area net-

work by simply making a serious entrance into the market.

While one can debate the various aspects of the Token-Ring, one thing is not debatable: IBM has made a serious commitment to local net technology. This commitment, combined with the sheer size of IBM, has been a strong factor in driving the local-area network market in the past 12 months.

IBM's decision to move the Network Basic I/O System (NETBIOS) from an adapter card into software has resulted in NETBIOS' becoming a de facto standard for International Standards Organization Layers 3, 4 and 5. NETBIOS emulators have appeared, which allow for the development of NETBIOS-compatible products that will run on many different types of local network hardware. Thus, three strong forces are influencing the local-area net market today:

- Novell's versatile and high performance software, a de facto standard that gives great flexibility and freedom of choice to the user.
- IBM's NETBIOS, a strong de facto

standard that gives the user a second shot at flexibility and freedom of choice.

- The presence of IBM with its "grand plan" in the local net arena, which lends much-needed direction and legitimacy to the market.

Currently, these factors tend to be mutually complementary. However, IBM's recent announcement of the 9370 processor line is a dark cloud on the horizon. The implications could be serious for Novell, placing it at a crossroads in its corporate strategy.

To understand why, it is necessary to step back and look at the forces that are currently driving the deployment of local-area networks within today's corporation.

In general, the introduction of personal computers within major corporations has been user-driven. Central MIS staff involvement has not been the norm.

Users purchased stand-alone personal computers, along with off-the-shelf software, to make their jobs easier. As more and more personal computers were acquired, the

next logical step was to hook them together on a local net for resource sharing.

Historically, this decision involved slogging through a quagmire of conflicting arguments about wire types, topologies and protocols. Novell eliminated this problem by offering a local-area network that would run on anything.

Moreover, the software currently running on stand-alone personal computers could be migrated to Novell's local net, with more sophisticated multiuser software available

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*Foldvik is a systems analyst at Pacific Northwest Bell in Seattle, Wash.*

# Opinions

## ► TELETOONS — By Phil Frank

*Now there's an improvement for you! Our last system took twice as long to do that.*



## VOICE/DATA TERMINALS IAN ANGUS

# Who says they're flops?

Lately, the trade press has been featuring articles on the failure of integrated voice/data terminals (IVDT) to live up to their initial marketing hype. In view of the fact that almost nothing in this industry lives up to its initial advertising, you'd think that no one would be surprised about IVDTs. But some reporters seem to think that they have uncovered a marketing disaster of major proportions. If that were true, however, it would be difficult to explain the lemming-like determination of manufacturers to introduce more and more of the devices.

In reality, not even telecommunications manufacturers will stick with money-losing products. While IVDTs aren't appearing on every desk and won't for some time, a growing market exists for them in certain forms.

There's not much of a market for generic IVDTs and stand-alone personal computers with attached handsets. As terminals, these devices are less functional than the units they are supposed to replace, and as telephones they aren't much better than standard single-line sets. The "integration" involved usually consists of no more than a common plastic case and an autodial feature. That's a pretty expensive way to buy a dialer. But there is a market for two types of IVDTs:

- Terminals designed to meet the needs and utilize the features of specific communications or information processing environments.
- Terminals that are part of systems that provide value-added voice/data applications.

Until recently, most examples of the first category have been private branch exchange-proprietary terminals, such as Northern Telecom, Inc.'s SL-1 Displayphone and Rolm Corp.'s Cypress, Juniper and Cedar products. Because they are specifically designed to work with one brand of PBX, these units can communicate at faster speeds, and offer more ease-of-use features than any stand-alone device. Another emerging product is a voice/data

terminal that is designed to work with specific computers. Recent products from Telex Computer Products and Northern Telecom, Inc. exemplify this trend.

The Telex C078 is a 3270 plug-compatible unit that provides all the features a 3270-user is familiar with, plus a built-in modem and telephone, speakerphone and headset jack. Auto-dialing for up to 600 numbers is included.

Northern Telecom's new Displayphone 220, which is designed and built by Wyse Technology, is specifically designed to emulate VT220, VT100 and VT52 terminals, allowing direct use with any Digital Equipment Corp. or DEC-compatible computer. The terminal has a 9-inch tilt-swivel screen (80 or 132 columns); serial, parallel and personal computer-compatible ports; 10 user-definable soft-keys; a screen-based calculator; and a 90-number autodialer.

While I can't comment on the functionality or operability of these specific terminals, they do embody a positive idea: They don't force the user to give up familiar function keys and display options just to acquire a phone and autodialer. That could make them important products for specific market niches.

Systems which offer integrated voice/data applications are still new. The Sydis, Inc. Voice-Station, with its voice-annotated text, was one of the first on the market, but Sydis failed to build an adequate marketing organization and seems to have fallen by the wayside. History will probably view the product as a premature precursor of the Northern Telecom DV-1 and the Wang Laboratories, Inc. Integrated Office Solution, both of which aim to be generalized voice/data processing systems.

A more focused and, finally, a more profit-oriented voice/data system is Davox Communications Corp.'s Computerized Autodial System (CAS), which offers a good reason to use Davox's IVDTs. The \$125,000 version of the system is designed for outward calling centers, such as collection departments or telemarketing centers. Telephone numbers and customer account information are loaded into an IBM Personal Computer AT-compatible personal computer; the

See **Integration** page 48

as an option.

The local network became an extension of the stand-alone personal computer environment. Personal computer software, operating systems and applications crept into the local net environment as a result of the needs and experience of users.

IBM's announcement of the 9370 product line is extremely significant for central MIS staffs. For the first time, the central data processing department will have the option of projecting its software environment into the user community. It will be possible to install a 9370 and directly connect it to the Token-Ring (or Ethernet), providing subsecond response time to attached personal computers. The 9370 will run standard mainframe software such as VM and PROFS.

Such an arrangement goes far beyond the Novell concept of a simple file server for shared resources. The 9370 could easily incorporate file server functions while providing centrally supported office automation products and distributed processing access to central corporate data bases. As a result, the direction of growth will likely reverse, with the mainframe hardware and software pushing

out into the local network. Novell may be caught in the middle. It faces a critical choice in the target market for its products. If the company continues on its course, it will gravitate toward the lower end of the market and will become the vendor of choice for the smaller work group-oriented local net user.

IBM will then begin to take over the high end of the market. Central MIS organizations will begin to take over the local-area network arena, projecting their hardware and software capabilities into the user community via a combination of the 9370 product line, VM and its associated software, as well as the high-speed connectivity of the Token-Ring. The consequences for Novell in larger corporations could be serious.

On the other hand, Novell may choose to attack the high end of the market, finding a niche in the emerging IBM distributed processing scheme. Such a strategy could be risky and costly for Novell.

Which direction will Novell take? Only time will tell. In the meantime though, users who get caught in the middle can only hope that Novell will learn to dance with the elephant. ☐

*Angus is president of the Angus TeleManagement Group, Inc., a telecommunications research and consulting firm in Toronto. He is also editor of the monthly newsletter, Telecom Systems Strategies.*

# Letters

## IRC recap

As the author of "Pirates or Robin Hoods?" in the November 24 issue, I was dismayed to see that the concluding paragraphs did not appear.

To recap, international record carriers (IRC), rather than competing fairly with worldwide message switching services, have falsely labelled them as "pirate carriers."

The Federal Communications Commission has ordered the IRCs to unbundle charges and offer separate cost-based charges for each element, and also ordered the detariffing of telex terminal equipment. Further, the Record Carrier Act of 1981 promotes fully competitive domestic and international markets for record carrier service. Nevertheless, some users claim the IRCs have threatened to take away, downgrade or increase the price of carrier-provided equipment unless exclusive or increased use of their transmission facilities occurs.

The following is the conclusion of my article:

"In July of 1982, in the face of numerous allegations of widespread IRC misconduct, the FCC stated that: 'it is further ordered that TRT, RCA, WUI, ITT and FTC cease and desist from marketing terminal equipment in a fashion which is dependent upon a customer's use of their transmission facilities or otherwise contrary to the determinations made herein.' Unfortunately for users, the IRCs have not ceased such practices.

"Users of international data communications should not feel bound to the IRCs. They need

not feel pressured to pay high IRC transmission prices just to keep their carrier-provided equipment. It is legal to use IRC equipment while using other, less expensive transmission services, regardless of what the IRC may say. These unlawful tactics used against message-switching companies can only persist as long as consumers are not informed about their legal rights.

"Deregulation was meant to turn a static industry into one that benefits the user. In the entrepreneurial spirit, message-switching companies are providing users with an alternative. These companies will not go away, despite IRC subterfuge and campaigns to undermine and reduce their legitimate business to piracy. 'Pirates' they are not. Robin Hoods, maybe."

Sincerely,  
Kate Hedges

Director of sales and marketing  
IBCS, Inc.  
Greenwich, CT

## The CBX situation

A number of claims made about Rolm Corp.'s products and plans in the Nov. 3 article, "Is Rolm readying CBX III?" are erroneous and misleading. In fact, they are inconsistent with statements made in another article on the same page of the same issue, "IBM weaving voice, OSI into SNA fabric." The comments in the latter article came from people who had attended the IBM/Rolm consultant's conference and were appropriately and currently briefed on strategy.

The writer appears not to understand the difference between architecture and technology. Our

basic CBX architecture has been with us for 10 years and will remain for the foreseeable future. It is the powerful blueprint that links components and interfaces together and enables us to change, add or delete components and interfaces as technology and the marketplace demand.

We have readily demonstrated the capability of the CBX to support all industry-standard interfaces, including the 8 KHz T-1/D3 interface. In fact, Rolm was one of the first vendors to announce T-1 capability in 1982 and has shipped T-1 spans in large numbers. Further, we are committed to the support of future standards such as Integrated Services Digital Network as they are developed.

Your article implies that the CBX II architecture needs to be changed to implement comprehensive connectivity with IBM products and be linked into their Systems Network Architecture network. The truth is that we have already implemented more than sixty IBM/Rolm connections and quite naturally our labs are continuing this work on others.

In addition, Rolm's newly announced NetView/PC Alert Monitor and Call Detail Collector enable the CBX to participate in SNA network management. We appreciate this opportunity to set the record straight.

George Harvey  
Vice-president, marketing  
Rolm Corp.  
Santa Clara, Calif.

*Letters may be edited for space and clarity.*

## OSI from page 4

believes transport and session-level products will be available next year, at which time he plans to shift the file transfer protocol to sit above these protocol layers.

"What we're seeing out of OSI is a reduction in cost and maintenance, and more competition. That means we're going to get compatibility and productivity," Lini said. Despite his general commitment to OSI, Lini's approach is cautious: "Our hedge is that even if OSI as a full implementation doesn't happen, the department is OK."

Vendors are also struggling to develop a strategy for moving from existing networking protocols to the ISO protocols. There are three basic implementation approaches open to vendors: coexistence, use of gateways and integration, according to Stephen Wendler, OSI product marketing manager for Digital Equipment Corp.

With coexistence, ISO protocols run side by side with existing protocols, such as those used by IBM in its Systems Network Architecture. Although this is easy to implement, it is possible the two protocols will never meet, Wendler said.

With a gateway approach, proprietary protocols are essentially "translated" to ISO protocols, and vice versa. On the plus side, gateways provide connectivity. On the minus side, gateways can cut into system performance since they require additional software and demand more processing power. Also, gateways generally require that communications be reduced to a common denominator in order to pass between protocols, causing the loss of some features and functionality, Wendler said.

Integrating proprietary and ISO protocols would require some interface between the protocols — a complex task, Wendler said. However, he added, the benefits would include expanded functionality, higher performance and relatively transparent connections. ▢

## Customization from page 46

For instance, Bellcore has been writing its own service applications software in C language on small UNIX-based minicomputers. This software drives a small programmable digital switch that provides the line and trunk interfaces needed for attachment to existing network switches.

The switch also allows attachment of synthetic speech, voice recording, voice recognition and other experimental technologies. The combination of the host processor, programmable switch and accessories is called the Modular Services Node (MSN).

The MSN helps provide quick-turnaround systems to meet new service trial opportunities with operating companies and their customers. Among the services field-tested with the MSN is a voice-prompting system installed in conjunction with a field trial of the Custom Local Access and Signaling System in Harrisburg, Pa.

Bellcore also conducted a trial in Chicago of automated Customer

Name and Address, a reverse directory service normally provided only by operators. In Atlanta and Detroit, Bellcore is currently running trials of fully automated collect and third-party billing services.

In every case, Bellcore has been able to mount field tests of a service with real customers at a small fraction of the customary cost and time.

The MSN technology and small-team approach is now being used to similar advantage within most of the seven regional Bell holding companies.

Bellcore's future work will use the MSN technology to provide trials of Intelligent Network and ISDN-related services. Through these small, customized trials, the operating companies can find, and perhaps offer on an interim basis, the services that the Intelligent Network and ISDN will ultimately provide on a long-term, low-cost basis. In so doing, customized solutions such as these will play a valuable role in network planning. ▢

## Integration from page 47

system then passes the numbers, eight at a time, to the autodialer.

If the dialer gets a busy signal or if the call is not answered after a preset number of rings, the number is sent back to the personal computer with a note to update the file.

If a connection is made, the call and associated information are immediately transferred to a live operator. This ensures that operators only receive connected calls and always have current information available.

As anyone familiar with outbound telemarketing can attest, if done effectively, it can produce major agent productivity improvements.

This is a value-added capability that requires both voice and data; it offers genuine voice/data synergy, not just two devices wrapped in the same piece of high-impact plastic.

Articles proclaiming the failure of IVDTs are like the articles that appeared in the late 1970s about management resistance to termi-

nals.

Dozens of office automation consultants made substantial incomes writing articles and giving speeches deploring the unwillingness of managers to use VDTs and terminals.

These consultants were floored when millions of managers rushed out to buy personal computers to use VisiCalc, Lotus 1-2-3 and the like.

Managers didn't want to use computers because computers didn't do anything useful for managers. As soon as real applications came along, managers adapted.

Similarly, the first generation of IVDTs, the generic computer phones, have not done well because they offer no substantial benefits beyond what could be achieved with two separate devices. Indeed, many of them cost more and do less than two separate devices.

Voice/data terminals, and voice/data integration in general, will succeed to the extent that they meet actual business needs, and deliver increased value. ▢

# NETWORK WORLD

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### PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.

- 1** My primary areas of activity. (Circle ONE only)
- I am involved in evaluating communications (data, voice and/or image) products and services:
1. for use within my own company/organization
  2. for resale to other companies/organizations
  3. Both
  4. Other (explain) \_\_\_\_\_

- 1a** For communications, my primary responsibility is: (Circle ONE only)
1. Data Communications
  2. Voice Communications
  3. Both
  4. Other (explain) \_\_\_\_\_

- 2** Circle only the ONE title classification which most applies to you.
- Company Management
11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement
- Communications Management
- Data Communications
21. Management
- VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff:
- Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services
- Telecommunications
31. Management
- VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development
32. Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services
- Factory Communications
41. Management
42. Supervisory/Staff
- MIS/Data Processing
51. Management
- VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications
- Others
75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other \_\_\_\_\_

- 3** Job Function
- Which one of the following best describes your functional involvement with communications (data, voice, and /or video) products? (Circle ONE only)

#### Corporate

1. Business Management, Planning and/or Development

#### Communications System/Network

2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other \_\_\_\_\_

- 4** Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)

#### Consultants

11. DP/Communications Consulting Services
12. Consulting Services (except DP/ Communications)

#### End Users

13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

#### Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other \_\_\_\_\_

- 5** In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)

1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

- 6** Check ALL that apply in columns A and B.

- A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

- B. These products and services are presently in use at this location:

A	B	Product/Services	A	B	Product/Services
<u>Computers</u>			<u>Transmission/Network Services Equipment</u>		
01.	<input type="checkbox"/>	Micros	18.	<input type="checkbox"/>	Microwave
02.	<input type="checkbox"/>	Minis	19.	<input type="checkbox"/>	Satellite Earth Stations
03.	<input type="checkbox"/>	Mainframes	20.	<input type="checkbox"/>	Local Area Networks
04.	<input type="checkbox"/>	Printers	21.	<input type="checkbox"/>	Wide Area Networks
<u>Data Communications</u>			22.	<input type="checkbox"/>	Packet Switching Equipment
04.	<input type="checkbox"/>	Communications Processors	23.	<input type="checkbox"/>	Fiber Optic Equipment
05.	<input type="checkbox"/>	Comm./Networks Software	36.	<input type="checkbox"/>	T1
06.	<input type="checkbox"/>	Digital Switching Equipment	<u>Communications Services</u>		
07.	<input type="checkbox"/>	Facsimile	24.	<input type="checkbox"/>	Packet Switching Services
08.	<input type="checkbox"/>	Modems	25.	<input type="checkbox"/>	Cellular Mobile Radio Services
09.	<input type="checkbox"/>	Multiplexers	26.	<input type="checkbox"/>	Electronic Mail
10.	<input type="checkbox"/>	Protocol Converters	27.	<input type="checkbox"/>	Enhanced Services
11.	<input type="checkbox"/>	Network Mgmt. & Control	28.	<input type="checkbox"/>	Centrex
12.	<input type="checkbox"/>	Test Equipment	29.	<input type="checkbox"/>	Long Haul Services
13.	<input type="checkbox"/>	3270 Controllers	30.	<input type="checkbox"/>	BOC Services
35.	<input type="checkbox"/>	Intelligent Terminals	31.	<input type="checkbox"/>	Independent Telco Services
<u>Telecommunications</u>			<u>Other</u>		
14.	<input type="checkbox"/>	PBXs	32.	<input type="checkbox"/>	Factory Communications
15.	<input type="checkbox"/>	Key Systems	33.	<input type="checkbox"/>	Online Data Bases
16.	<input type="checkbox"/>	Central Office Equipment			
17.	<input type="checkbox"/>	Integrated Voice/Data Terminals			

- 7** Estimated value of communications systems, equipment and services:

- A. which you helped specify, recommend or approve in last 12 months? (Check only ONE in column A.)

- B. which you plan to specify, recommend or approve in next 12 months? (Check only ONE in column B.)

A			B			A			B		
1.	<input type="checkbox"/>	<input type="checkbox"/>	\$10 million and over			6.	<input type="checkbox"/>	<input type="checkbox"/>	\$100,000 - \$249,999		
2.	<input type="checkbox"/>	<input type="checkbox"/>	\$5 million - \$9.9 million			7.	<input type="checkbox"/>	<input type="checkbox"/>	\$50,000 - \$99,999		
3.	<input type="checkbox"/>	<input type="checkbox"/>	\$1 million - \$4.9 million			8.	<input type="checkbox"/>	<input type="checkbox"/>	Under \$50,000		
4.	<input type="checkbox"/>	<input type="checkbox"/>	\$500,000 - \$999,999			9.	<input type="checkbox"/>	<input type="checkbox"/>	Don't Know		
5.	<input type="checkbox"/>	<input type="checkbox"/>	\$250,000 - \$499,999								

- 8** Estimated gross annual revenues for your entire company/institution: (Circle ONE only)

1. Over \$1 billion
2. \$500 million to \$1 billion
3. \$100 million to \$499.9 million
4. \$50 million to \$99.9 million
5. \$10 million to \$49.9 million
6. \$5 million to \$9.9 million
7. under \$5 million

- 9** Estimated number of total employees at this location: (Circle ONE only)

- |                  |              |              |            |
|------------------|--------------|--------------|------------|
| 1. Over 5,000    | 3. 500 - 999 | 5. 100 - 249 | 7. 20 - 49 |
| 2. 1,000 - 4,999 | 4. 250 - 499 | 6. 50 - 99   | 8. 1 - 19  |

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## ▶ ELECTRONIC DATA INTERCHANGE

**CDC, MSA/GEISCO bare EDI wares at user meet**

BY JIM BROWN  
New Products Editor

WASHINGTON, D.C. — Control Data Corp. (CDC) and a paired-up Management Science America, Inc. (MSA) and General Electric Information Services Co. (GEISCO) last week launched new Electronic Data Interchange (EDI) offerings at the EDI Association's National Data Systems Forum & Exhibit here.

CDC unwrapped a personal computer-based software package that allows users to create and transmit EDI documents.

Applications software powerhouse MSA announced a joint marketing agreement with GEISCO that calls for MSA to develop an interface from its mainframe Expert EDI software to GEISCO's EDI\*Ex-

press network service.

In a related announcement, Western Union Corp. said it will use its packet-switched network to carry EDI traffic. (See "EDI eases Easylink order entry," page 12.)

EDI is intended to standardize the manner in which documents such as purchase orders, bills of lading and invoices are created and exchanged electronically, enabling companies with disparate computer systems to do away with the paperwork associated with ordering and shipping. With EDI, documents are translated to a standard format and transmitted over networks that support EDI communications protocols.

Among the standard EDI document formats are the internationally accepted X12 standard devel-

oped by ANSI, the Automotive Industry Action Group standard developed for use in the automotive industry and a standard developed by the Transportation Data Coordinating Committee.

CDC's Redi-Micro package, listing for \$700, runs on IBM Personal Computers and allows users to create and interpret material releases, purchase orders, invoices and replies. The package includes communications software that hooks into Control Data's subsidiary Business Information Service's Redinet network.

The firm offers optional software for Redi-Micro, including the asynchronous Redi-Comm and the higher speed bisynchronous Redi-3780. Selling for \$200 each, both optional packages are invoked with a single Redi-Micro command and reportedly monitor and correct transmission errors, and provide audit trails. The Redi-3780 package requires the use of a personal computer board that supports binary synchronous communications.

All Redinet and Redi-Micro offer-

ings support the ANSI X12 standard, according to CDC.

Under terms of the MSA/GEISCO agreement, MSA will interface its application-embedded Expert EDI package to GEISCO's EDI\*Express network service. Both firms will continue selling their software packages separately, but will jointly provide EDI consulting, education and training.

MSA recently acquired the rights to modify and integrate Georgia-based TranSettlements, Inc.'s TranSlate package with its application software and to market the resulting package under the Expert EDI name. The TranSlate package translates documents to EDI standard formats.

Expert EDI will reportedly support application-to-application exchange of invoices, purchase orders, shipping notices and other business related documents.

Expert EDI is to be integrated with MSA's mainframe Order Processing, Purchasing, Accounts Payable and Accounts Receivable packages. □

**US West from page 1**

on vendors to target markets carefully. It also raises questions as to whether the expansion-hungry Bell operating companies have reached out too far, too fast.

US West's retrenchment will result in the immediate layoff of 180 salespeople and 50 executives. The company said another 835 support staffers will be dismissed upon fulfillment of several long-term contracts.

US West will take a one-time charge of \$52 million after taxes, or 27 cents per share in the fourth quarter of this year. The write-down covers employee severance costs, asset write-offs and operating costs incurred during the restructuring.

"The profit margins from the sale of business communications equipment outside this territory are not sufficient to continue funding those operations," said John Jester, president of US West Information Systems. He noted that overall sales at Information Systems doubled between 1985 and 1986 and are strongest in US West's own region.

"The market projections don't indicate any significant changes in the CPE market in the near future," said US West spokesman Steve Lang. "The company believes it can make better investments than in the sale of CPE outside our territory."

While the consolidation of US West's unregulated customer premises equipment operations raises doubts about BOC diversification, analysts say the circumstances that necessitated US West's decision are unique to the BOC.

A good portion of US West's out-of-region customer premises equipment activity was in California, "which is not a good place for a CPE vendor to be these days," said William Rich, senior analyst with Northern Business Information in New York. "[Pacific Telesis Group] recently acquired all of Northern

Telecom's CPE distribution operations in California, and I'm sure US West saw that as an additional threat."

"In that same deal, PacTel acquired Northern Telecom distribution facilities in key US West markets, a move US West had to view as encroachment," Rich said.

"US West is going to face increasing competition from PacTel at home and decided to put its energy and money in the area where it has the best chance of succeeding," Rich said.

Information Systems will "focus its strengths in our major markets and with selected large national accounts," according to Lang. "We will continue to develop systems integration applications that give us a competitive edge." Analysts said US West has met with greater success in the systems integration business than in customer premises equipment sales.

"The competition in the CPE market, especially in low-end private branch exchanges, is ferocious," said Ian Angus, president of Angus TeleManagement Group, a consulting firm in Toronto. "Profit margins are paper thin. The CPE market is a zoo."

"The only way to make money in this market is to sell product upgrades to your existing customer base, and the BOCs have not been all that good at this," Angus said. "The BOCs are accustomed to leasing a piece of equipment and milking it for all it's worth." Now the BOCs are faced with the need to build a strategy based on selling new products to the customer base, such as voice messaging and data communications features, Angus noted. "This is an area they're not as familiar with."

US West has been refocusing its customer premises equipment activities for a year now, and the decision to concentrate on the company's own region reflects the decision to focus on its primary customer base, Rich said. □

**TDS from page 2**

For a one-time \$400 administrative charge, a TDS 1.5 user can opt to have the high-speed link established over fiber-optic cable. This feature will, according to MCI, be available in some 70 metropolitan areas by the end of the first quarter of 1987.

Mayfield said that increased competition in the T-1 service arena will save users money and decrease the need to rely on AT&T's central office switching capabilities. "Users will be able to pick and choose among high-quality, low-cost T-1 transport services," he said.

Many long-distance service providers boasting nationwide nets comprising primarily light-wave cable currently offer T-1 links at prices 30% to 50% below AT&T's T-

1 rates, Mayfield noted.

Mayfield stressed that the current abundance of capacity on numerous vendors' fiber-optic cable-based networks cannot yet be labeled a glut. "We don't think there will be a destructive pricing war in the market," he said.

"What you are seeing are a series of strategic pricing moves made by long-distance carriers who are trying to make their services more appealing to large users," Mayfield explained.

MCI claimed it has raised the performance capabilities of the interoffice

channel portion of its T-1 links. The carrier claimed the link boasts 99% reliability. MCI said it provides 24-hour monitoring of the T-1 facilities and will provide users with emergency backup capabilities. □

*"The carrier  
claimed the  
link boasts  
99%  
reliability."*

**FTS from page 2**

MCI Communications Corp., Northern Telecom, Inc. and the respective BOCs of the seven regional Bell holding companies. The BOCs are expected to be included in any bids on FTS 2000 since, as monopolies, they are restricted from signing an exclusive contract with any one company.

AT&T is considered by many industry observers to be in the best position to secure the new contract in view of its experience running the current FTS network and its history of managing large nets.

"AT&T has the lion's share of government telephone business and is the odds-on favorite to win the new contract," said George Dellinger, a telecommunications analyst with Washington Analysis Corp.

When asked why AT&T needed a

partner to bid for FTS 2000, Golm said AT&T was responding to the GSA requirement that FTS be implemented by one prime contractor coupled with a group of subcontractors. The GSA is the branch of the federal government that manages the FTS and handles all purchasing for 10 federal agencies.

Some observers say AT&T is working with other companies to avoid accusations from competitors that it is monopolizing the FTS contract. By including other companies in the bid, AT&T can't be accused of abusing its dominant position, Dellinger said.

The final FTS RFP is expected to be issued by the GSA by the end of this year. Bids will be due by the middle of next year, and the contract will be awarded at the end of 1987. □

**EDS from page 1**

subsidiary of General Motors Corp., is currently building a three-tier, nationwide communications network for the automaker.

"EDS Communications will tell companies that it can help them reduce communications costs," Anderson said. In certain circumstances, he added, EDS Communications will put the user's communications staff on its payroll. Anderson predicted EDS Communications will ink equipment contracts with Northern Telecom and Tandem "at very large discounts, acting as distributors for these companies."

Northern Telecom would neither confirm nor deny EDS Communications' intent to purchase huge

quantities of communications gear from the private branch exchange maker. Tandem Computers also declined to comment on reported discussions between the company and EDS Communications.

Amid speculation that EDS is planning to construct a communications net to meet the transmission needs of the new company, Jaros said EDS is evaluating fiber-optic

transmission systems offered by AT&T and US Sprint Communications Co. These facilities would be used to support the traffic of numerous users. How extensive the network would be is still unclear.

"We have been evaluating fiber-optic transmission systems for several months. We would run customer traffic on the network to fill [the network] up," he added. "The net-

work would not be exclusively used by any one customer."

Jaros also declined comment on the purpose or future of the nascent organization, but did say EDS Communications is currently without a staff. He denied the group was created as part of an internal EDS restructuring. "There was no restructuring or reorganization other than putting another box under Gary Fernandes," Jaros said.

The Yankee Group's Anderson added the new EDS company will soon launch a recruitment drive to address the company's need for sales and other personnel. He challenged EDS' claim that, beyond a chief executive officer and other ranking officials, the company is without staff. □

*"EDS is evaluating fiber-optic transmission systems offered by AT&T and US Sprint Communications Co."*

**FCC from page 2**

the requirements of the court."

Nancy C. Garrison, assistant chief of the Communications and Finance section, Antitrust Division of the Justice Department, declined to comment on AT&T's filing, although she noted that Justice will be filing comments with Greene on the matter within 10 days.

The BOCs feel this is an attempt by AT&T "to maintain its monopoly in manufacturing and long distance by creating additional obstacles that will delay true competition," a Bell Atlantic Corp. spokesman said. "The change would make the FCC a subordinate agency of the Decree Court," he said.

According to a communications industry spokesman who asked not to be identified, "Greene streamlined the waiver process a year ago, and it seems to be working. This is a delay tactic by AT&T to keep the BOCs from getting involved in competitive areas."

Greene's streamlined waiver process enabled all BOCs to engage in a business once the court set a precedent by ruling on one such request. If one BOC is granted permission to engage in international consulting, for example, all BOCs are allowed into that market under the streamlined procedure.

Representatives from communications users groups said they supported the basic principle of AT&T's recommendation.

Brian Moir, legal counsel for the International Communications Association, said, "AT&T has made a very responsible attempt at reaching a compromise. It was a brilliant filing, and I am surprised at the vehement opposition of the BOCs."

"Telecommunications users would like to see this sort of thing enacted because we have greater input at the FCC than we do with the courts," said Shirley Fujimoto, an attorney representing the Association of Data Communications Users, the Utilities Telecommunications Council and the American Petroleum Institute Telecommunications Committee.

"Users can submit public comments with the FCC on any matter before the commission," she said. The public does not have such an opportunity with the Justice Department. □

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## ► ETHERNET EXPRESS

## Intel link gets IBM nod

BY PAULA MUSICH  
Senior Editor

PHOENIX — Intel Corp.'s System Interconnect Operation (SIO) brought out what may be the first IBM-approved high-speed IBM System/370-to-Ethernet link last week.

The connection, an enhancement to SIO's Fastpath connectivity product line, provides a direct channel attachment between System/370 hosts and Ethernet. Fastpath Ethernet is a single Ethernet

adapter that fits in one of six available slots in the Fastpath base unit, a device that serves as an alternate to IBM communications controllers.

Although SIO's General Manager Roger Thomas refused to comment on a development relationship with IBM, Scott Haugdahl, a senior systems specialist with Architecture Technology Corp., a consulting company based in Minneapolis, is convinced IBM worked with Intel to develop the product. "It's a good strategy to do it through Intel because of the controversy surround-

ing IBM's stance toward Ethernet," he said.

SIO, an independent business unit within Intel based here, developed the \$5,500 controller board to provide OEMs with the means to support System/370s on their networks using a channel-attached link. Most networking vendors go through IBM's front-end processors, which limit data rates to 56K bit/sec.

Fastpath Ethernet is compatible with the Ethernet adapter for the new IBM 9370 processor announced in October, according to Thomas. Because the new 9370 is based on System/370 architecture, any Ethernet software that runs on the 9370 should run on the S/370 with Fastpath Ethernet, including

the Transmission Control Protocol/Internet Protocol networking software IBM announced with the 9370, Thomas said.

Compatibility is achieved through the incorporation of IBM's Continuous Executing Transfer Interface protocol specification, which IBM's development lab in Boeblingen, West Germany made available to Intel as an OEM. This protocol, also used in IBM's Ethernet adapter for the 9370, provides the protocol connection to the host node's operating system.

The Fastpath Ethernet board is compatible with all System/370 architecture processors, including IBM's 4300, 3080, 3090 and other vendors' plug-compatible mainframes. □

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## Infotron from page 7

loss in revenue this year, analysts said. In addition to the charge against earnings for consolidation costs, Infotron said it expects to write down the value of some investments in the fourth quarter as well.

Specifically, Barnhill said the company expects to sustain a loss from operations at Applitek Corp., a Wakefield, Mass.-based local network vendor 40% owned by Infotron. Infotron also has an investment in Network Switching Systems, Inc. of Andover, Mass., a company that has had problems getting its N16 Switch T-1 multiplexer to market. □

## Fibronics from page 5

Ethernet-compatible products that Fibronics bought earlier this year.

Analysts said FDDI-based networks will be best suited for mainframe-to-mainframe links and would also be appropriate for networking engineering workstations.

Initially the network is expected to cost between \$50,000 and \$70,000 per connection, each node requiring a 4-board interface and cabling. Weinberg said work to reduce the interface's chip set to a single board will lower the price to \$20,000 by late 1987.

The 10-year-old Fibronics expects to do about \$30 million in sales for 1986. The firm's main line of business has been supplying fiber-optic hub-type devices that condense signals from traditional cables into a lightwave that is transmitted to other hub-type devices on different building floors or in different buildings of a campus network. □

## Bridge from page 7

the media, illegal access or electronic eavesdropping," said William Carrico, Bridge Communications' president.

In the commercial sector, Carrico anticipates a need for secure transaction systems, such as funds transfer networks for banks.

Once the acquisition is completed some time in January, Phoenix Technology will become a wholly owned subsidiary of Bridge Communications. □

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- \* Feb. 2 - Bypass
- \* Feb. 23 - Departmental Networking
- \* March 16 - Wiring & Cable

### Product Focus

- \* Jan. 19 - T-1 Multiplexers
- \* Feb. 16 - Network Management & Test
- \* March 9 - Local Area Networks
- \* March 30 - Digital PBX's (Med-High)

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- \* Jan. 26 - Software Defined Networks
- \* March 2 - Long Haul Carrier Private Line Services
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Develop next generation Network Management systems, network monitor and control system, operator interface subsystem and configuration/system status data management subsystem. May involve utilizing AI techniques and fourth-generation languages. BS/CS and 6-8 years' experience operating systems, data management systems or communication systems required. Exposure to AI techniques a plus.

As a senior technical contributor of Xodiac Transport development team, work on the development of ISO-based networks for intelligent controllers, and integration of Xodiac system with AOS/VS. Lead associates in development effort. Requires a BSCS, CE or EE or equivalent plus 6-8 years' software development experience. Project leadership experience a plus. Knowledge of PL/1, C and assembler, operating systems and/or communications experience beneficial.

Participate in design and implementation of FTAM SASE product development including writing functional and design specifications, writing and testing code, and integration of product. Requires a BS/CS or equivalent and 6-8 years' software development experience, including a minimum of 3 years in communications or operating systems.

As a system programmer for VM and MVS IBM system, responsibilities include installation configuration and maintenance of MV, VTAM, NCP, CICS, DISOSS, PS/370, VM, PROFS, RSCS and miscellaneous communication software products. Work closely with R&D groups to develop special configurations tools to develop and test products that will interface with IBM systems in an R&D environment. Requires a BS in CS, or equivalent and 6-8 years' experience including a minimum of 3 years' installing and maintaining MVS system components.

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# Calendar

**Dec. 17-19, New York — Dexpo East '86, the 11th DEC-Compatible Exposition.** Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

**Dec. 17-29, Boston — Managing the Strategic Data Planning Project.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

**Dec. 18-19, Denver — X.25: Evaluating and Selecting Offerings and Options.** Also, Jan. 15-16, Minneapolis; Jan. 29-30, Boston; Feb. 5-6, Atlanta; Feb. 19-20, Washington, D.C. Contact: Center for Advanced Professional Education, 1820 E. Garry St., Suite 110, Santa Ana, Calif. 92705.

**Jan. 6-8, Washington, D.C. — An Introduction to Data Communications.** Also, Jan. 12-14, Albuquerque, N.M.; Jan. 14-16, Hartford, Conn.; Jan. 21-23, Indianapolis. Contact: American Institute, 55 Main St., Madison, N.J. 07940.

**Jan. 12-13, Dallas — Introduction to Telecommunications Systems: Technologies and Applications.** Contact: BCR Enterprises, 950 York Road, Hinsdale, Ill. 60521.

**Jan. 12-13, New York — Networking Personal Computers.** Also, Jan. 29-30, Washington, D.C.; March 12-13, New York; April 2-3, Miami. Contact: New York University, School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

**Jan. 12-13, Dallas — MVS Overview.** Contact: Acts Corp., P.O. Box 180, Kingsland, Texas 78639.

**Jan. 12-14, Los Angeles — IBM Products & Architectures.** Also, Feb. 4-6, Chicago; Feb. 18-20, New York; March 4-6, Phoenix; March 11-13, San Jose, Calif. Contact: Center for Advanced Professional Education, 1820 E. Garry St., Suite 110, Santa Ana, Calif. 92705.

**Jan. 14-16, Washington, D.C. — Protocols for Open Systems Interconnection.** Contact: Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052.

**Jan. 18-21, San Antonio, Texas — Association of College & University Telecommunications Administrators' Winter Seminar.** Contact: Association of College & University Telecommunications Administrators, 211 Nebraska Hall, Lincoln, Neb. 68588.

**Jan. 19-21, Atlanta — SNA Concepts and Products.** Contact:

American Data Group, Inc., 1770 Indian Trail Road, Suite 295, Oakbrook Plaza, Norcross, Ga. 30093.

**Jan. 19-21, New York — Data Communications I: An Introduction to Concepts and Systems.** Also, March 16-18, New York; Feb. 2-4, San Francisco; April 27-29, Toronto. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

**Jan. 20-21, Los Angeles — SYSCON/87-West: OEM Computer Peripherals Sub-Systems Conference and Exposition.** Contact: MultiDynamics, Inc., 17100 Norwalk Blvd., Suite 116, Cerritos, Calif. 90701.

**Jan. 20-21, Los Angeles — BUSCON/87-West: The Bus/Board Users Show and Conference.** Contact: MultiDynamics, Inc., 17100 Norwalk Blvd., Suite 116, Cerritos, Calif. 90701.

**Jan. 22-23, Orlando, Fla. — Maximizing the Potential of Your Voice Messaging System.** Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

**Jan. 29-30, Boston — X.25: Evaluating and Selecting Offerings and Options.** Also, Feb. 5-6, Atlanta; Feb. 19-20, Washington, D.C.; March 2-3, Los Angeles; March 5-6, San Jose, Calif. Contact: Center for Advanced Professional Education, 1820 E. Garry St., Suite 110, Santa Ana, Calif. 92705

**Jan. 29-30, Washington, D.C. — Packet Tech '87.** Contact: TeleStrategies, 1355 McLean Road, McLean, Va. 22101.

**Feb. 2-6, Washington, D.C. — Understanding Microcomputer Data Communications: A Hands-On Approach.** Contact: Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052.

**Feb. 5-6, Boston — An Intensive Introduction to T1 Networking.** Also, Feb. 9-10, Atlanta; Feb. 12-13, Detroit; Feb. 19-20, Princeton, N.J. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

**Feb. 18-19, Washington, D.C. — The International Conference on Satellite Communications and Broadcasting.** Contact: Rose Hill, Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

**Feb. 25-27, Phoenix — Sixth Annual Phoenix Conference on Computers and Communications.** Contact: Stephen Paquette, Phoenix Metro Group, 34 W. Monroe, Suite 900, Phoenix, Ariz. 95003.

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## ► PRODUCT REVIEW

# The bulk data battle

*Three software packages better IBM's BDT program.*

BY JOHN J. HUNTER  
Contributing Writer

If you are an IBM Bulk Data Transfer (BDT) user and are unhappy with its file handling limitations, Cincom Systems, Inc., Software Research Corp. and The Systems Center have better ideas.

BDT is probably the most extensively used system for transferring large bulk files, but it runs only under MVS operating systems and does not support VSAM, Indexed Sequential Access Method (ISAM), Basic Direct Access Method (BDAM), or Fast Dump Restore (FDR) files. Also, it has no parallel data transfer session facility and does not support application interfaces.

Cincom Systems' Net/Master, Software Research's Strategic Network Environment File Transfer Facility (SNE/FTF) and The Systems Center's Network Data Mover (NDM) create a software data delivery network that works with existing communications facilities and employs dedicated batch transfer sessions to deliver data.

All three systems support interactive and bulk file transfer systems and handle a wider range of files than BDT. They also run on more operating systems and furnish more sophisticated control and scheduling facilities.

In addition, SNE/FTF and NDM support personal computers, and the Software Research system permits file transfers between IBM, Wang Laboratories, Inc. and Digital Equipment Corp. minicomputers.

### Product rundown

Net/Master is part of a complete systems management package. The file transfer portion is a VTAM application that runs on IBM hosts using the MVS and VSE operating systems. File types supported include VTAM, FDR, Partitioned Data Sets (PDS), Sequential Access Method (SAM), and Generation Data Group (GDG). Files can be tape- or disk-resident.

SNE/FTF runs as a VTAM application on MVS and VM machines, and handles tape- or disk-resident VSAM, PDS, FDR, GDG and Queued Sequential Access Method (QSAM) files. It also transfers SAM and ISAM files between IBM hosts and DEC or Wang machines, and transfers SAM files between the IBM host and MS-DOS-controlled personal computers.

NDM also runs as a VTAM application on MVS and VSE hosts, and supports tape- or disk-resident VSAM, PDP, FDR, SAM, GDG and BDAM files. Like SNE/FTF, NDM provides SAM file transfers between the host and personal com-

puters; however, it does not offer diverse system support. Net/Master also does not provide diverse system support, nor does it handle personal computers.

The PDS support furnished by all three systems allows users to transfer an entire PDS or individual members of a PDS. This support includes load libraries. The user determines whether the transfer will include or exclude certain members, generically specified members or a range of members.

SNE/FTF and NDM personal computer support facilities employ

All systems employ a dialogue facility that monitors and controls users as they log on and off the system, and all provide the menus and screens for the operator to invoke system file transfer services. For example, commands are provided to permit users to indicate the selected nodes to receive the file, the receiver identification code and the file's transmission priority.

Some files can receive higher transmission priorities than others, and files can be designated for deferred transmission. To run the interactive facility, the host must be



multaneous bidirectional transmission between one or more nodes. All three products also allow parallel data transfer sessions. This permits simultaneous bidirectional file transfers and allows multiple processes to be executed concurrently.

All three systems allow the user to control the flow of data between nodes. Information such as the number of concurrent transfers to be handled, the number of transfers to and from nodes, and the size of the file and record blocks can all be programmed.

SNE/FTF and NDM employ the standard VTAM Network Control Program (NCP) facilities to control data transmissions. Under VTAM NCP, the user defines one or more physical links between node members, and then VTAM NCP segments the files and transmits them over the most efficient path. This increases file transfer efficiency since multiple portions of each file are transferred simultaneously.

Cincom's Net/Master does not require formal transmission groups. Rather, it automatically determines the most efficient multiple paths based on transport media loading and breaks the file into sections before transmitting them. The Net/Master approach should be more efficient since it will dynamically adjust the transfer paths.

All three systems provide a checkpoint/restart facility to eliminate the need to retransmit an entire file after transmission failure. All systems also provide an audit trail of transactions.

### Summary file

SNE/FTF, NDM and Net/Master provide more sophisticated file transfer facilities than those offered by BDT.

SNE/FTF, NDM and Net/Master offer basically the same bulk file and interactive services, but differ in the operating systems they run under and the file types accommodated. SNE/FTF also handles IBM file transfer, but it's the only competitor that transfers files among IBM, DEC and Wang hosts.

With so many companies looking for a means to exchange information with diverse systems, SNE/FTF holds an advantage.

NDM and SNE/FTF will also exchange files with MS-DOS-based personal computers. Cincom is also considering personal computer support for Net/Master.

The prices in the comparison chart are for each end. All vendors offer discounts for additional copies used at each end. By contrast, IBM's BDT, Version II, is offered on a licensed basis only. Monthly charges are \$800 for a basic system, \$575 for file-to-file transfer and \$485 for RJE JES3. □

## File transfer software capabilities and costs

	Vendor/Product		
	Cincom Systems, Inc./ Net/Master	Software Research Corp./ SNE/FTF	The Systems Center, Inc./ NDM
MVS support	✓	✓	✓
VM support	✓	✓	
VSE support	✓	✓	✓
PC interface		✓	✓
Parallel sessions	✓	✓	✓
Diverse host interface		✓	
Price per end	\$35,000	\$25,000-\$35,000 for central unit; \$2,000-\$12,000 for peripheral unit	\$34,000

SNE/FTF = Strategic Network Environment/File Transfer Utility  
NDM = Network Data Mover

SOURCE: TMS CORP., DEVON, PA.

IBM 3270 emulation to transfer files between the host and personal computer. The SNE/FTF also employs IBM 3270 emulation to transfer files between the IBM host and Wang VS, DEC VAX and DEC CMS systems.

All emulation is handled by a printed circuit that plugs into the minicomputer. SNE/FTF and NDM will also transfer files to local-area networks. SNE/FTF works with Banyan Systems, Inc. file servers, and NDM interfaces with a Corvus Systems, Inc. Omninet equipped with a Systems Network Architecture gateway. NDM is also offered with a separate module that works with Network Systems Corp.'s Hyperchannel, a multipoint baseband local networking bus that interconnects processors and peripherals for resource sharing.

### Architectural differences

The architecture employed by Net/Master and NDM is based on peer-to-peer communications, while SNE/FTF uses a master and slave arrangement. With NDM and Net/Master, all software modules controlling user dialogue, file transfers and data transfer control are loaded into each node.

SNE/FTF employs a star-like configuration, in which one or more computers in the network are designated as central control nodes that route information to peripheral nodes.

equipped with IBM's Time Sharing Option. All three systems employ job control language commands for batch transfers, or users can insert file transfer commands directly into applications.

The file transfer system converts and reformats files for movement between host facilities. The user can specify that a file be copied or replaced, and portions of files can be placed in other files. Symbolic file names can be used.

All three systems also permit the file transfer operation to be interrupted, suspended or canceled while in process.

All the systems employ user profiles that govern the functions users can perform. For example, files that can be accessed and operations that can be performed, such as read-only, update, add and delete, are contained in the profile. Further user restrictions can be enforced by employing security features provided by vendor data communications handling facilities such as VTAM's password system.

All three products employ a proprietary protocol when transmitting data between peer nodes. In IBM parlance for SNA, communications between nodes is done at the Logical Unit Zero level; all other communications are conducted at the Logical Unit 2 level.

The three systems perform data compression to increase the volume of data transmitted and support si-

Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.



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